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COMMERCIAL FISHERIES REVIEW

I

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COVER: Positioning of air hose (a perforated polyethylene pipe) through which air was pumped to create an air bubble curtain to control migration of alewives in the Milwaukee River. SCUBA divers aided project. (See page 1.)



UNITED STATES DEPARTMENT OF THE INTERIOR

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AN EVALUATION OF THE AIR BUBBLE CURTAIN AS A BARRIER TO ALEWIVES

By George A. Kupfer* and William G. Gordon**

ABSTRACT

The effectiveness of an air bubble curtain to impede, redirect, or stop the annual migration of alewives in the Milwaukee River was studied in the spring of 1964. Its operation during a $1\frac{1}{2}$ -month period indicated that the curtain reduced the migration of alewives.

BACKGROUND

The opening of Welland Canal provided a path for alewives to migrate into the upper Great Lakes (Miller, 1957). Reaching Lake Michigan by the late 1940's, the alewives grew to phenomenal numbers, each year apparently increasing several fold in numbers over the previous year. During the last 6 years, the City of Milwaukee has been plagued by large migrations of alewives into the Milwaukee, Kinnickinnic, and Menomonee Rivers during May, June, July, and part of August. Soon after entering these rivers they die in large numbers, and cause an extensive sanitation problem. This discourages owners from improving their properties abutting the river in such a manner as to make the river an asset to the community.

Mortalities of alewives in fresh water are not new. Although records of mortalities in Lake Ontario date back to 1890 (Smith, 1892), no reasons are given for the possible cause of death. Graham (1956) and Threinen (1958) suggest that mortalities are due to detrimental changes in body metabolism probably following abrupt changes in water temperature. Observations and data from this study in 1964 indicate that a lack of sufficient dissolved oxygen is also a contributing factor.

An initial survey of the local situation in March 1964 revealed limitations to devices that could be used to control migrations up the rivers. Because of low water and navigation in the Menomonee, Kinnickinnic, and lower Milwaukee Rivers, barriers could not be used in those portions generally navigated by large lake vessels. These rivers, from the junction of the Milwaukee and Menomonee Rivers south and east to the lake, have become silted, and maximum depth is about 25 feet. The Milwaukee River after it separates from the Menomonee is navigable by smaller pleasure craft to the North Avenue Dam.

The development of an air bubble curtain apparatus by the U. S. Bureau of Commercial Fisheries demonstrated the practicality of guiding the Atlantic herring (Smith, 1961). Air pumped through perforated polyethylene pipe made an air curtain that tended to direct the movements of young herring in clear water. Upon review of this work, the city officials of Milwaukee, Wis., implemented a study to determine the effectiveness of the air bubble curtain and assess its possible application as a permanent control.

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STUDY AREA

Since large ships travel north on the Menomonee River beyond the junction with the Milwaukee River, the air bubble curtain was installed in the Milwaukee River just north of its confluence with the Menomonee before reaching the heavily populated downtown business area (fig. 1). The east bank of the river was chosen as the site to install the air compressor unit because a municipally owned lot was available at that point immediately adjacent to a fire station that was manned continually (fig. 2). The availability of fire department personnel to

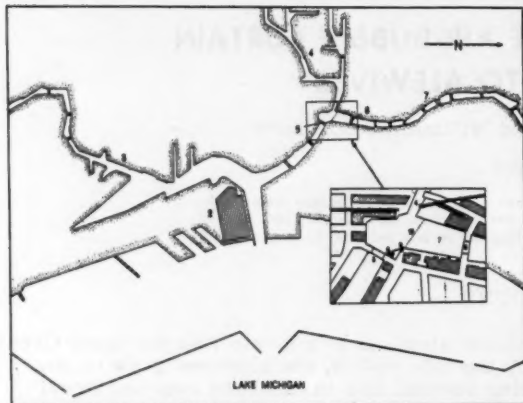


Fig. 1 - City of Milwaukee Harbor Area: (1) Government breakwater, (2) Sewage Treatment Plant - Jones Island, (3) Kinnickinnic River, (4) Menomonee River, (5) North Water Street bridge, (6) Buffalo Street bridge (7) Milwaukee River, (8) Fire station, (9) Compressor and other equipment, (10) Air hose.

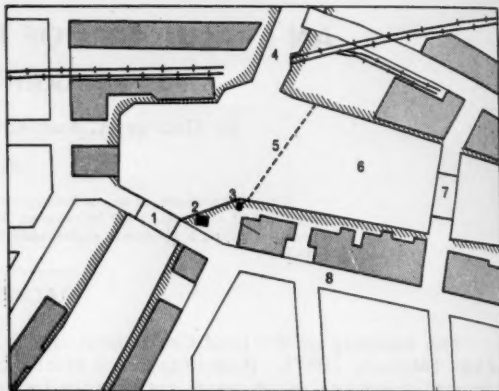


Fig. 2 - Diagram of study area: (1) North Water Street bridge, (2) Fire station, (3) Equipment location, (4) Menomonee River, (5) Air hose, (6) Milwaukee River, (7) Buffalo Street bridge, (8) North Water Street.

check on the operation of unit assured uninterrupted operation. At this point, the hose was 500 feet long and transversed the river on a 45° angle to the shoreline. This would tend to lead the fish along the trailing edge to the west bank of the river where commercial netting was planned. The depth of the water in this area was about 22 feet.

EQUIPMENT AND INSTALLATION

THE PLASTIC HOSE: Two lengths of plastic hose, rated to withstand 100 pounds per square inch, were connected by a regular air hose reducer fitting. The first 250 feet of this hose was 1 inch in diameter and the remaining 250 feet was $\frac{3}{4}$ -inch diameter. Holes (0.0135-inch diameter) were drilled every 6 inches with a No. 80 jewelers drill. One end of the hose was plugged. A length of $\frac{3}{4}$ -inch chain was attached along the entire length of the hose by nylon seaming twine to keep the hose on the bottom in the desired position. As the hose was drilled and the chain attached, the two sections were placed on two large reels aboard a barge (fig. 3). This technique made it easy to place hose on the bottom of the river by attaching a line in the desired diagonal across the river and moving the barge along this line (fig. 4). The end of the plastic pipe was secured to a rigid pipe secured to a piling on the west bank of the river (see cover page).



Fig. 3 - Barge used to place air hose.

COMPRESSOR UNIT: A diesel-powered air compressor which delivered 315 cubic feet per minute (free air rating) was set up on the east shore of the study area. This unit supplied air at about 80 pounds per square inch pressure on 18-second cycles, i.e., 9 seconds "on" time followed by 9 seconds "off" time. A pressure tank of 200-gallon capacity, with pressure valve and gauge, was installed at the outlet of the compressor. The tank helped cool the air through expansion and a large radiation surface.

Operation during warm weather produced air of extremely high temperature; therefore, additional cooling was needed to prevent softening or melting the plastic pipe. From the regulated pressure tank, 120 feet of copper water tubing 1-inch diameter was spiraled loosely into about 5-foot coils. The air was directed from the pressure tank to this tubing, which was hung on a rod so that the coils were submerged below the surface of the water.

The "radiator" sufficiently cooled the air to a temperature compatible with the semirigid plastic pipe. The temperature of the air entering the rigid pipe after flowing through the cooling coil never exceeded 76° F. even in

80° F. weather. Constant maintenance, such as oil changes and greasing, is needed on a diesel unit which is to be kept in operation for extended periods of time. A 160-cubic foot per minute standby compressor was kept on the site for emergency use and was connected so that the unit could be operated to ensure constant air flow when the main compressor was not functioning.



Fig. 4 - Reeling out hose and chain.

Because of the excessive noise of the compressor unit, a plywood structure, consisting of three walls and a roof, was built over the unit (fig. 5).

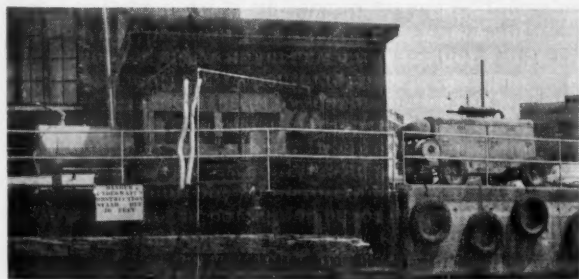


Fig. 5 - Equipment installation.

Since the installation obstructed the east shore of the river, a lighted sign was posted on the river bank to inform boat traffic of the obstruction. As the main compressor unit consumed about 80 gallons of diesel fuel every 24-hour period, a 275-gallon fuel supply was hooked directly to the compressor engine to reduce the number of refueling operations.

After the pipe was installed, the compressor unit was started to prevent silt from entering or clogging the holes in the plastic pipe and the pressure was slowly brought up to the desired

80 pounds per square inch. During early operation, the air curtain was a solid and continuous stream of readily visible bubbles (fig. 6). As the study progressed the initial holes tended to close, because of the burrs left on the inside of the pipe during drilling. To correct this, SCUBA divers punched holes with a fine pin at 2-inch rather than 6-inch intervals. This diameter (0.02 inch) was about double that of the No. 80 drill. The close-spaced holes produced a much more vigorous, uniform, and probably more effective curtain (fig. 7). Unfortunately, as the study went on, even the larger holes became partially plugged and the action was reduced.

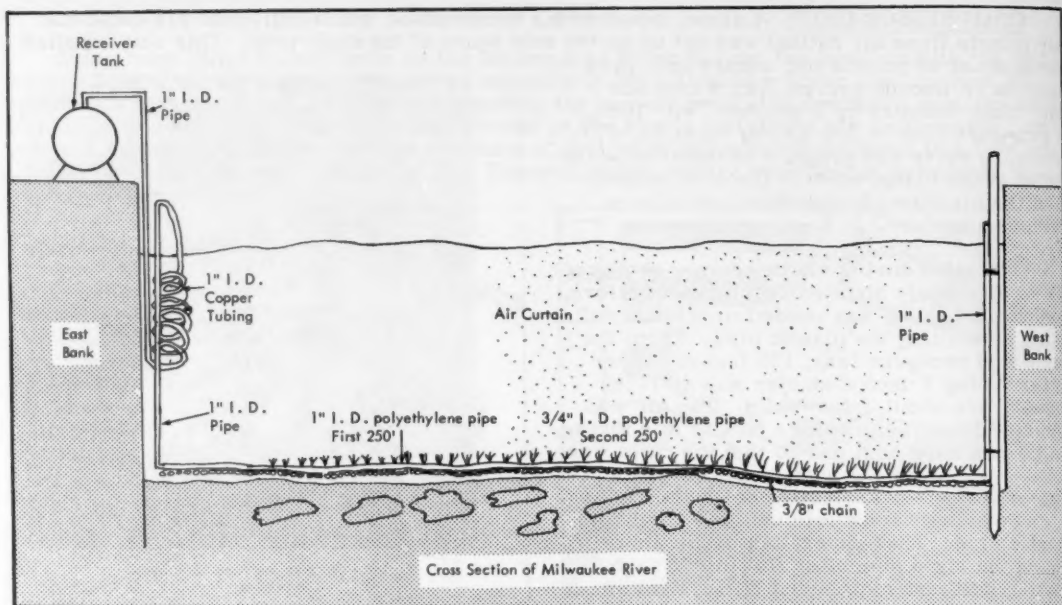


Fig. 6 - Diagram of air hose installation.

MEASURE OF EFFECTIVENESS

Gill nets, one on each side of the air curtain, were used to evaluate the number of fish traveling through the air curtain. Because the rivers are navigated by pleasure boats and other smaller craft, the nets had to be set below the normal draft of such boats. Gill nets were 6 feet deep by 100 feet long and made of $1\frac{1}{2}$ -inch (stretch) nylon webbing. These nets extended across the river so that fish near the bottom would be caught no matter at what point in the river they migrated. To minimize the length of the nets needed, one was placed between the abutments of the Buffalo Street bridge and the other between the abutments of the North Water Street bridge (see fig. 2). The width of the river at those points (between the abutments) is about 100 feet. The nets were fished each Monday, Wednesday, and Friday. The nets



Fig. 7 - Air curtain with holes spaced at 6-inch intervals (0.1 inch in diameter).



Fig. 8 - Setting test net.

were fished a shorter time on days when many fish were present in the netting area. Both nets, however, were fished for the same length of time and during the same period to obtain comparable results. Because of strong currents, a line was attached between the pilings of the bridges, along which a small barge was operated for setting and picking up the nets (fig. 8). As the nets were picked out of the water, the enmeshed alewives were counted and recorded.

FISHING RESULTS

Gill-netting during the first week gave inconsistent results (fig. 9). At first, the net above the air curtain would have greater numbers of fish than the net below. From May 18 through June 15, 1964, the downstream net consistently caught more fish than the upstream net. The first erratic results may have resulted from fish in the river before the study began.

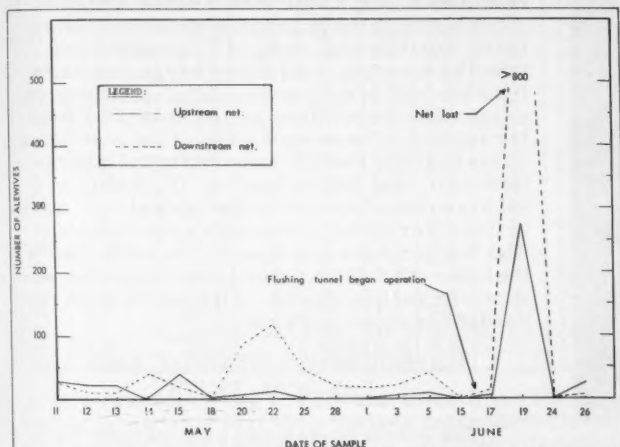


Fig. 9 - Number of alewives caught by gill nets above and below the air-bubble curtain during summer 1964.

during dry weather in the summer to alleviate the stagnant condition of the river by discharging about 18 million gallons of water per hour through the outlet. The intake for this flushing station was located in the main harbor adjacent to the Milwaukee Yacht Club. A small self-cleaning screen over the intake was not considered feasible for such a short experiment; therefore, the pumps at the flushing station were turned off and remained off until 9:00 a.m. on June 16, 1964. Then, because of dry weather flow and adverse river conditions, the flushing tunnel was used. As a result, alewives were pumped into the river behind the air curtain at the rate of about 2,000 fish a day. Undoubtedly these fish contributed to the catch of the net upstream.

A commercial minnow dealer who regularly fished in the entire river and had daily contact with these areas reported that the alewives were present in the rivers before this study began. He reported netting small numbers of alewives as far upstream as the dam. He stated, however, that about 1½ to 2 weeks after the air curtain installation, no alewives were found in that stretch of the river which extended from the curtain to the dam. He stated that after June 16, he again began to catch alewives in his minnow nets. This fisherman believed that the curtain was successful. His observations would again tend to lend credence to the experiences of City personnel and to explain some of the early results.

CHEMICAL AND PHYSICAL TESTS OF WATER QUALITY

To provide data from this study which might be comparable with like studies at a future time, basic chemical and physical determinations of the water quality in the study area were made. Surveys were made on Mondays, Wednesdays, and Fridays to measure temperature

and obtain samples to determine turbidity, dissolved oxygen, and pH (fig. 10). The dissolved oxygen measurements were taken at three points: (1) 25 feet upstream from the air curtain, (2) 25 feet downstream, and (3) 75 feet downstream.



Fig. 10 - Dissolved oxygen determination.

Two samples for oxygen and pH were taken at each of those points, one at the 6-foot depth and the other at the 15-foot depth. In addition, a turbidity sample was taken 25 feet upstream from the air curtain. Other samples also were taken at various other locations in the river system throughout the study period but these are not shown in this report. These included the Menomonee River, Kinnickinnic River, and at various points in the Milwaukee River northward to the North Avenue dam. All samples were taken by lowering a dissolved oxygen sampler from the boat to the depths indicated. Dissolved oxygen was determined by the improved Winkler method. The samples were first stabilized on the boat and then transferred to the laboratories for final determination. Turbidity and pH were also measured in the laboratory. Turbidities were determined with a fluorometer. The temperature was taken by the personnel in the boat with a thermister lowered into the water to the various depths. All results were recorded for later analysis.

RESULTS OF CHEMICAL AND PHYSICAL TESTS

The levels of dissolved oxygen were lower downstream from the air curtain than

they were upstream. The Menomonee River was extremely low in dissolved oxygen concentrations. The mixing of waters of the Menomonee River and Milwaukee River resulted in lower dissolved oxygen readings, both 25 feet and 75 feet below the air curtain.

The dissolved oxygen determinations (table 1) revealed that the median dissolved oxygen 75 feet upstream of the air curtain was 1.25 mg. per liter at the 6-foot level and 1.50 mg. per liter at the 15-foot level. The median at the sampling point 25 feet downstream was 1.35 mg. per liter at 6 feet and 1.45 mg. per liter at 15 feet. At the point 75 feet downstream, the 6-foot depth showed a median dissolved oxygen content of 1.40 mg. per liter, while at 15 feet the reading was 1.20 mg. per liter. These changes apparently result from the influence of the Menomonee River and stratification as the two rivers combine. As stated previously, the dissolved oxygen during the study steadily decreased during dry weather until the influence of the fresh water from the flushing tunnel was noted at the sampling points.

Samples taken upstream in the Milwaukee River showed increasingly more dissolved oxygen to the North Avenue dam, while the Menomonee River was low in dissolved oxygen, which may account for the heavier fish kill observed there. The dissolved oxygen in the Milwaukee River was less than 0.5 p.p.m. when the flushing was resumed. The low oxygen content indicated that the river was in a critical state and that flushing was necessary. The average daily water temperatures varied from 61.5° F. through 73° F. during this period. The mean turbidity in the Milwaukee River was 37 p.p.m. during the study period (see table 1), the median pH was 7.63.

OBSERVATIONS

The migration of alewives into the Milwaukee River during the test period appeared erratic. During previous years, fish entered the river to spawn from mid-May through mid-

Table 1 - Water Samples of the Milwaukee Rivers for Chemical Analyses by the Milwaukee Health Department, Summer 1964. Dissolved Oxygen (DO) is Expressed in Milligrams/Liter and Turbidity in Parts/Million.

Date	75 Feet Upstream of Air Curtain						25 Feet Downstream of Air Curtain				75 Feet Downstream of Air Curtain				Av. Water Temp. of Air Curtain °F.	Av. Air Temp. °F.
	6 Ft. Depth		15 Ft. Depth		Turb.	pH	6 Ft. Depth		15 Ft. Depth		6 Ft. Depth		15 Ft. Depth			
	DO	% Sat.	DO	% Sat.			DO	% Sat.	DO	% Sat.	DO	% Sat.	DO	% Sat.		
1964:																
5/8	4.4	48	4.0	44	-	-	3.5	38	3.2	35	3.6	40	2.8	30	68	71
5/11	4.85	52	4.1	44	60	-	3.2	34	3.25	34	3.9	42	3.75	40	66.25	58
5/13	3.76	40	3.0	32	60	-	2.4	26	2.25	24	2.45	26	2.23	24	67	46
5/15	5.05	51	4.7	47	52	-	4.5	45	4.05	41	3.95	40	3.95	40	61.5	61
5/18	0.6	7	0.3	3	38	1.6	0.3	3	0.6	6	0.5	5	0.3	3	67.5	71
5/20	4.8	54	3.3	37	45	8.2	3.5	39	3.0	33	2.9	32	2.9	32	70	45
5/22	2.6	28	3.15	33	42	7.8	2.75	30	3.2	34	2.75	29	3.25	33	65.25	76
5/25	1.0	11	1.0	11	74	7.66	1.2	13	1.1	12	1.1	12	1.1	12	69	64
5/27	1.3	15	1.1	13	62	7.68	1.3	14	1.2	14	1.2	14	0.0	0	70.5	57
5/28	1.2	13	1.3	14	51	7.6	1.6	17	1.9	21	1.5	16	1.6	17	69	50
6/1	1.6	18	1.6	17	36	7.7	1.7	18	1.6	17	1.5	16	1.3	14	67	51
6/3	0.6	7	0.6	7	29	7.68	0.7	8	0.7	8	0.7	8	0.7	8	69	55
6/5	0.2	3	0.2	2	32	7.63	0.4	4	0.3	3	0.4	4	0.2	2	68	58
6/8	1.3	14	1.1	12	31	7.6	1.1	12	1.2	13	1.3	15	1.3	14	69	64
6/10	1.2	14	1.25	14	33	7.5	1.4	16	1.4	16	1.6	18	1.6	18	72	59
6/12	0.8	9	0.8	9	30	7.5	0.9	10	0.8	9	0.6	7	0.7	8	70	68
6/15	0.45	5	0.3	3	30	7.5	0.4	5	0.4	5	0.4	5	0.4	5	73	60
6/17	0.85	10	1.75	20	27	7.6	0.8	9	1.5	16	0.7	8	0.8	9	70.75	62
6/19	7.8	85	6.2	67	25	7.6	4.4	50	5.1	55	4.3	47	5.6	60	67	81
6/22	0.6	7	0.5	6	20	7.5	0.5	6	0.5	6	0.6	7	0.5	6	73	68
6/24	0.8	9	0.3	3	48	7.6	0.5	6	0.4	4	0.6	7	0.4	4	69.5	67
6/26	4.7	53	4.1	46	28	7.78	3.4	37	3.4	37	3.1	35	3.0	33	70	82
Mean	2.29		2.03		40.62	7.32	1.82		1.87		1.80		1.74		68.74	62.45
Median	1.25		1.50		37.0	7.63	1.35		1.45		1.40		1.20			

June, a few appearing in July and sometimes the early part of August. Observations during the study indicate that the alewives move through the entire cross-sectional area of the river, do not move at any specific depth, and that migrations may be related to temperature or other weather factors.

In early May, the local fishing fleet reported that the fish had moved close to the harbor area by the time the study began. Later reports by commercial fishermen indicated that large schools of the fish were present in the lake and also in the main harbor and lower river. They reported, however, that fish seemed to move constantly between the air curtain and the outer harbor. Few fish were seen at or near the air curtain at most times.

A visual survey was made three times a week to determine numbers of dead fish in the areas above and below the air curtain. All such results were recorded and returned to the Health Department for analysis. In addition to these observations, local commercial fish operators made echo-soundings throughout the test period and were able to determine concentrations of fish in the various areas of the rivers, harbor, and lake. All observations made by commercial operators, as well as their catch, were recorded and retained by the Health Department (see table 2).

Table 2 - Alewives Harvested by Commercial Fishermen from the Milwaukee Harbor During Air Curtain Study, Summer 1964

Date	Location	Fishing Gear	Catch in Pounds
1964			
May 16	Outer Harbor $\frac{1}{2}$ mile North of River Mouth	Lampara	350
	Outer Harbor - North Cut	"	600
	South of Air Curtain	"	1
May 20	Outer Harbor	Lampara	400
	Kinnickinnic River Mooring Basin	"	125
May 29	Outer Harbor	Trawl	600
June 2	Outer Harbor	Trawl	2,000
June 3	Outer Harbor	Trawl	3,450
June 4	Outer Harbor	Trawl	1,500
June 11	Outer Harbor	Trawl	925
Total			9,951

Commercial fishermen reported that the heaviest run of fish up the river was encountered around June 19 and that the main run may have been over by June 29, even though some schools of alewives remained in the harbor. They also reported extremely large schools of alewives in Lake Michigan. As funds were unavailable to continue operation of the air curtain, the study was ended June 30, but the main run of the alewives was apparently encountered during the study. Further migrations of alewives into the Milwaukee River was not apparent during July, and caused no further nuisances.

Generally, the visual observations revealed large numbers of dead fish below the air curtain and smaller numbers above. The largest numbers of dead fish were noted at the junction of the Menomonee River and in the area of the junction of the Kinnickinnic River. Although dead fish were constantly sighted upstream, it is not known how long they had been dead. Many of the fish above the air curtain were quite deteriorated. Most fish were probably noted several times in the week-to-week searches.

Fish were often observed dying downstream from the air curtain. In only a few cases, however, were dying fish noted in the Milwaukee River above the air curtain. Because of inability to determine when those fish had died, the visual method of observation was unreliable for showing quantitatively the effectiveness of the air curtain. It did indicate, however, that the air curtain was somewhat successful in stopping the alewives from migrating up the Milwaukee River.

Commercial establishments in the downtown area were checked to determine whether the water intakes for their air conditioning systems were affected by large numbers of alewives. Personnel of these establishments reported an exceptional decrease of alewives found in their intakes during May and June. All establishments reported that around the third week of June, many fish were again found in their intakes, which coincides with the time that the large run of alewives was encountered and the time that the flushing tunnel was being operated.



Fig. 11 - Dead fish and debris in river.

The effectiveness of the air curtain may have been biased by several factors. The location of the curtain during the study may have hindered evaluation since the fish had few alternative routes when the curtain was reached. Commercial operators, while attempting to fish in the test area, ran into difficulties due to currents and large amounts of debris that tore their nets during fishing (fig. 11). Consequently, commercial netting was discontinued after two attempts to remove alewives in this area. The gill-netting data showed that about 36 percent of the fish near the bottom may have gone through the air curtain during this study. Thus, migration through the

curtain may have been due to the large number of fish involved, the lack of alternative routes, and a "forcing" of the fish through the barrier. Commercial harvesting of the alewives in the main harbor may have alleviated this problem by reducing the number of fish reaching the area below the air curtain.

The migration of fish up the Milwaukee River may also have been affected to some extent by the removal of about 10,000 pounds of alewives by fishing in the harbor area by commercial fishermen (table 2). Most of those fish were caught in the outer harbor and only one small catch was made in the Kinnickinnic River.

LITERATURE CITED

- GRAHAM, J. J.
1956. Observations on the Alewife, *Pomolobus pseudoharengus* (Wilson), in Fresh Water. Publications of the Ontario Fisheries Research Laboratory, No. 74, 43 pp.
- MILLER, ROBERT RUSH
1957. Origin and Dispersal of the Alewife (*Alosa pseudoharengus*) and the Gizzard Shad (*Dorosoma cepedianum*) in the Great Lakes. Transactions of the American Fisheries Society, vol. 86, for the year 1956, pp. 97-111.
- SMITH, HUGH M.
1892. Report on an Investigation of the Fisheries of Lake Ontario. Bulletin of the U. S. Fish Commission, vol. 10, for the year 1890, pp. 177-215.
- SMITH, KEITH A.
1961. Air-Curtain Fishing for Maine Sardines. U. S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 23, No. 3 (March), pp. 1-14. (Also as Separate No. 615.)
- THREINEN, C. W.
1958. Life History, Ecology, and Management of the Alewife. Wisconsin Conservation Department Publication 223, 8 pp.

HOT SARDINE SANDWICH

- 3 cans ($3\frac{3}{4}$ or 4 ounces each) Maine sardines
6 hamburger buns
2 tablespoons butter or margarine
 $\frac{3}{4}$ cup catsup
1 tablespoon chopped onion
 $\frac{2}{4}$ teaspoon oregano
Dash garlic powder
 $\frac{1}{2}$ cup grated cheese



Drain sardines and break into large pieces. Cut rolls in half and spread with butter. Place rolls, butter side up, on a cookie sheet, 15 x 12 inches. Place sardines on each half roll. Combine catsup, onion, oregano, and garlic powder. Place approximately 1 tablespoon catsup mixture over sardines. Sprinkle cheese on top. Bake in a very hot oven, 450° F., for 8 to 10 minutes or until cheese melts and rolls toast. Serve hot. Serves 6. (Recipe by the home economists, National Economics Research Center, U. S. Department of the Interior, Bureau of Commercial Fisheries, College Park, Maryland.)

TRENDS AND DEVELOPMENTS

Alaska Fisheries Explorations and Gear Development

POTENTIAL OF COMMERCIAL FISHERY FOR LARGE ALASKA SHRIMP STUDIED:

Giant Alaska shrimp, also described as "prawns" may soon be available as a result of research being conducted under the Alaska exploratory fishing and gear development program of the Interior Department's Bureau of Commercial Fisheries.

The Bureau is following up on the results of this research by offering assistance to the fishing industry in the form of detailed technical information on methods and design of gear, handling methods to obtain the highest quality of product, and assistance in marketing.

According to Harry L. Rietze, Regional Director of the Bureau of Commercial Fisheries at Juneau, fishing for Alaska shrimp is not a get-rich-quick type of activity, but is ideally suited for the 8- or 9-month nonproductive gap now experienced by the salmon fishermen living in remote villages of Southeast Alaska. Vessels that are used in the salmon fishery can easily be adapted to the shrimp fishery and employ a one- or two-man crew. The major capital outlay by the fisherman to start commercial production would be for the construction of shrimp pots at a cost of \$10 to \$15 each. One vessel should be able to handle 100 to 200 pots for a profitable return based on the findings so far.

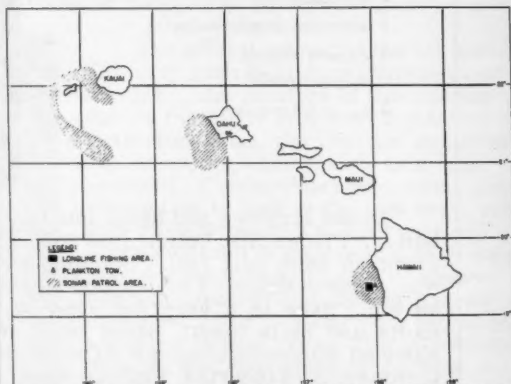
The Bureau of Commercial Fisheries also provides financial assistance to qualified fishermen for the purpose of financing, refinancing, repairing or maintaining vessels, equipment and gear.



Central Pacific Fisheries Investigations

SONAR STUDIES FOR LOCATING SUBSURFACE TUNA:

M/V "Townsend Cromwell" Cruise 24 (April 14-June 10, 1966): Familiarization and development of sonar techniques in searching and tracking subsurface tuna schools was the objective of this cruise by the research vessel Townsend Cromwell of the Interior Department's Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. The area of operations was within 100 miles off the islands of Hawaii, Kauai, and Oahu.



Areas in which tuna were studied with CTFM sonar during M/V Townsend Cromwell Cruise 24 (April 24-June 10, 1966).

After installation of a specially designed frequency-modulated sonar system on the vessel, adjustments and calibrations were made to eliminate internal interferences and optimize the performance of the sonar. Two characteristic noise patterns of unknown origin occurred on the visual and audio displays during operations at sea. They occurred irregularly but often enough to hamper the operator's ability to locate and follow targets.

The sonar equipment was subjected to detailed acceptance tests under the supervision of the Defense Research Laboratory of the University of Texas. The overall performance at sea was evaluated. The equipment did not meet specifications in several areas: The source level of the high frequency projector was about 10 decibels (referenced to 1 microbar) below that specified; the transducer assembly did not scan or tilt properly at speeds greater than 4 knots; minor lobes on the vertical beam of the high frequency hydrophone was 10.5 decibels higher than expected; antifouling treatment of transducers appeared ineffectual.

To familiarize personnel with operational procedures, four types of sonar operations were carried out: (1) tracking of tuna schools, (2) searching with ship underway, (3) searching with ship hove to, and (4) patrolling of long-line sets.

To maximize opportunities to track schools, the vessel approached bird flocks which were located visually. Sonar contacts were made with 28 schools. They were 2 schools of estimated 20-25 pound skipjack, 2 schools of estimated 12-14 pound skipjack, 7 schools of estimated 5-8 pound skipjack, 4 schools of estimated 1-3 pound skipjack, 1 school of estimated 100-pound yellowfin, and 12 schools of unidentified fish. The greatest distance of positive sonar contact with a school; was 650 meters (2,132 feet). Successful tracking varied from momentary contacts to tracking a school of large skipjack for 56 minutes. The sonar operator was able to stay with the school even though it sounded twice during that period. Successful tracking of the elusive skipjack will require great skill, persistence, and a technique which will have to be developed step by step.

A total of 42 hours was devoted to searching with the vessel underway at 3-4 knots--38 hours were in darkness. Highlight of the searching was the discovery of a surface school of 100-pound yellowfin and a school of large skipjack approximately 50 meters (164 feet) below the surface which eventually surfaced. Identifications were visual. Returns of various descriptions were received from 12 unidentified targets.

Searching with the sonar while the vessel was not underway was done only at night--2 nights (18 hours) in open ocean and 2 nights (16 hours) anchored in 35 meters (114.8

feet) of water. On each occasion a night light was submersed 8 meters or 26.2 feet below the surface to attract organisms. During the 34 hours at this activity, three characteristic types of sonar returns were observed. Only one type was seen on any given night but it recurred many times throughout the night. One type was associated with akule (*Trachuroops crumenophthalmus*) 35 centimeters or 13.8 inches long caught at the stern of the vessel.

Long-line gear was set on 4 days. A total of 60 baskets was set on the first day and 40 baskets on subsequent days. The total catch was 5 big-eyed tuna (*Thunnus obesus*), 15 yellowfin tuna (*T. albacares*), 6 skipjack tuna (*Euthynnus pelamis*), 6 wahoo, 11 shortnose spearfish (*Tetrapturus angustirostris*), 5 striped marlin (*Makaira audax*), 1 unidentified marlin, 4 common dolphin (*Coryphaena hippurus*), 5 *Alepisaurus* sp., 5 great blue shark (*Prionace glauca*), and 1 whitetip shark (*Pterolamiops longimanus*).

Of 127 sonar returns observed while the vessel patrolled the longline, 3 were subsequently matched with fish on the longline. These were a shortnose spearfish, a yellowfin tuna, and a wahoo. A total of 62 of the sonar returns was observed on the first day, and experience from subsequent days suggested that many of them were echo returns from the gear itself. Eleven of the targets were moving; a strong target was swimming at a depth of 220 meters (721.6 feet).

Some general observations of the cruise were: (1) the sonar was used to determine the depth of the longline on one occasion. Midway between the two buoys the longline was 103 meters or 337.8 feet below the surface. (2) The sonar was used to determine the depth of a 1-meter (3.28 feet) plankton net during a tow. The depth of the net was calculated from the wire angle and the length of wire out was 195 meters (639.6 feet) at the deepest part of the tow. The depth of the net determined by the sonar at the same time was 140 meters or 459.2 feet; (3) The ocean bottom was detected up to 1,600 meters, or 5,248 feet, the maximum range of the sonar.

Routine bathythermograph (BT) and weather observations were made during the cruise and all *Alepisaurus* sp. caught on the long-line gear were preserved in formalin.

In 3 days in the area west of Kauai 28 schools were sighted. They were 15 skipjack, 1 yellowfin, 1 skipjack and yellowfin, and 11 unidentified. Fifteen skipjack schools and 15 unidentified schools were sighted during the 5 days off Kona. In 4 days off Oahu 10 skipjack and 23 unidentified schools were sighted.

Note: See Commercial Fisheries Review, August 1965 p. 31.

TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 92 (June 12-17, 1966): To collect and return live scombrids for body density and red muscle size determination for locomotion and hydrostatic equilibrium studies was the main objective of this cruise by the research vessel Charles H. Gilbert. The vessel is operated by the Bureau's Biological Laboratory at Honolulu. The area of operations was within 30 miles of Oahu.



Research vessel Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries.

Other objectives of the cruise were to:

- (1) Collect and return live scombrids to the laboratory's behavior tank facilities for studies on schooling behavior, determination of hearing thresholds and red muscle physiology.
- (2) Collect fresh samples of fish eye lenses and brains for the Pacific Biomedical Research Center, University of Hawaii. The samples will be used for enzyme studies.
- (3) Return yellowfin tuna that have been bled in different manners and chilled in ice to determine if blood streaks in cooked fish can be avoided.

Results of the cruise follow: (1) Densities and gas bladder volumes of 5 yellowfin tuna were determined. Scombrids of desired species and size were not caught for red muscle size determination. (2) A total of 216 skipjack tuna and 34 wavyback skipjack were returned live to behavior tank facilities. Several other objectives of the cruise were not completed.

Thermograph and barograph were operated continuously during the cruise and the standard watch for fish, birds, and aquatic mammals was maintained. Trolling lines were out continuously between Kewalo Basin and each fishing station. The total trolling time was 25 hours--10 skipjack (Katsuwonus pelamis), 17 wavyback skipjack (Euthynnus affinis), and 5 yellowfin (Thunnus albacares) were caught.

Note: See Commercial Fisheries Review, July 1966 p. 20.



Columbia River

EARLY SEASON 1966 SOCKEYE SALMON RUN BETTER THAN EXPECTED:

More than 97,000 sockeye (blueback) salmon had passed over Bonneville Dam by July 7, 1966, indicating that the escapement of 80,000 fish over Rock Island Dam, set by the Oregon Fish Commission and the State of Washington Department of Fisheries as the optimum number needed to adequately utilize the upriver spawning areas, would be substantially exceeded this season. "Based on a comparison of this year's observations with those of previous years, the present run is expected to exceed 120,000 fish," the Oregon Fish Commission director said. Despite this better than expected run, the Commission recommended that no sockeye season be permitted Columbia River gill-neters this year.

On the basis of the size of the run alone, a substantial number of sockeye salmon could have been harvested. The run had been carefully monitored since the fish began passing over Bonneville Dam in June 1966, but a number of factors led to recommendations that no sockeye netting be allowed.

Even with gill-net mesh stipulations and other restrictions, it was believed that the

number of summer chinook that would be taken during a sockeye fishery would be serious in view of the poor condition of the summer run. It also appeared certain that more summer steelhead would have been taken than sockeye and, in view of the fact that the summer steelhead run was just getting under way, and there was no substantial indication of how big the run would be, it seemed inadvisable to allow the taking of any substantial number of steelhead until greater escapement was obtained.

The sockeye run passes upriver in a relatively short period of time with the majority of the fish moving over Bonneville Dam between mid-June and mid-July. Even if a season had been authorized this year, it was too late for a reasonable harvest since possibly 80 percent of the run had passed Bonneville Dam and undoubtedly a substantial portion of the remainder was in the 5-mile reach of the Columbia River immediately below Bonneville Dam which is closed at all times to commercial fishing. Extreme fluctuations in numbers characterize the sockeye run which, since 1938, has ranged from 12,000 to 327,000 fish annually in an irregular up and down pattern, stated the Oregon Fish Commission director.

This year's run was encouraging in view of the fact that the parent run in 1962 totaled only 29,000 fish over Rock Island Dam which the sockeye must pass to reach the Wenatchee and Okanogan Rivers, the only remaining spawning grounds of the species in the Columbia River system. It indicates the resilience of the species and offers promise that sockeye runs in the future could provide a harvestable surplus. The Rock Island site, near Wenatchee River, is some 450 miles above the mouth of the Columbia River.

The fresh-water habitat requirements are more restrictive for sockeye salmon than for the other four species of Pacific salmon since the young sockeye must have ready access to lakes in which they remain for at least a year before starting their migration to the sea. This fact precludes any extensive effort to introduce sockeye into other parts of the Columbia River system except where suitable lakes and reservoirs exist.

Sockeye salmon seldom take bait or artificial lures of any kind and their harvest is therefore confined to gillnetting in the river when the fish are on their upstream migration. "It appears there will be no har-

vest of sockeye in the Columbia River this year, but assuming successful spawning and normal survival of the young, this year's fine escapement should mean good returns to fishermen in four years," the Oregon Fish Commission director concluded. (Oregon Fish Commission, July 9, 1966.)



Commercial Fisheries Research and Development Act

GRANT-IN-AID FUNDS APPORTIONED TO STATES FOR FISCAL YEAR 1967:

The second apportionment amounting to \$4.1 million in grant-in-aid commercial fisheries research and development funds to the States was announced July 29, 1966 by Secretary of the Interior Stewart L. Udall.

The money was appropriated by Congress under a 1964 act to improve commercial fisheries resources of the United States. A similar apportionment of \$4.1 million was made in July 1965.

Apportionment of Funds for Fiscal Year 1967 Under the Commercial Fisheries Research and Development Act of 1964

State and Area	Allocations	State and Area	Allocations
Alabama	\$ 43,500	Nevada	\$ 20,500
Alaska	246,000	New Hampshire	20,500
Arizona	20,500	New Jersey	157,500
Arkansas	20,500	New Mexico	20,500
California	246,000	New York	180,600
Colorado	20,500	North Carolina	53,000
Connecticut	20,500	North Dakota	20,500
Delaware	28,600	Ohio	47,900
Florida	246,000	Oklahoma	20,500
Georgia	90,400	Oregon	120,200
Hawaii	33,300	Pennsylvania	53,500
Idaho	20,500	Rhode Island	25,800
Illinois	23,500	South Carolina	22,100
Indiana	20,500	South Dakota	20,500
Iowa	20,500	Tennessee	20,500
Kansas	20,500	Texas	246,000
Kentucky	20,500	Utah	20,500
Louisiana	246,000	Vermont	20,500
Maine	214,700	Virginia	176,700
Maryland	175,400	Washington	209,400
Massachusetts	246,000	West Virginia	20,500
Michigan	21,600	Wisconsin	20,500
Minnesota	20,500	Wyoming	20,500
Mississippi	121,000	American Samoa	53,300
Missouri	20,500	Guam	20,500
Montana	20,500	Puerto Rico	218,500
Nebraska	20,500	Virgin Islands	20,500

Allocation of money is based on the value of the commercial fishing industry of the various States, the Commonwealth of Puerto Rico, American Samoa, Guam, and the Virgin Islands. No State may receive more than 6 percent, or less than one-half of one

percent, of the fund. Maximum permissible grants--\$246,000 each--were allocated to Alaska, California, Florida, Louisiana, Massachusetts, and Texas.

Under the research and development program, the States are reimbursed for up to 75 percent of the costs of approved projects. The research and development programs are administered by Interior's Bureau of Commercial Fisheries.

The tabulation lists the apportionment of funds to each State and other entity for the 1967 fiscal year, which began July 1, 1966.

Note: See Commercial Fisheries Review, Sept. 1965 p. 22.



Fish Hatcheries

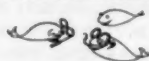
COMPREHENSIVE SURVEY OF NEEDS FOR HATCHERY FISH ANNOUNCED:

A survey to determine future needs for hatchery fish to help manage the Nation's sport fisheries was announced July 24, 1966, by Secretary of the Interior Stewart L. Udall.

The survey will be made by Interior's Bureau of Sport Fisheries and Wildlife in cooperation with State fish and game departments. It will be used to estimate the water now suitable for sport fish and how much of this is or should be stocked, number of fishermen, future stocking needs, and capabilities of National, State, and private hatcheries. The survey is also expected to be helpful in deciding the future roles of public and private hatcheries.

In announcing the survey, Secretary Udall said data gathered will be projected to cover needs for "hatchery fish" in 1973, 1980, and 2000. "The role of artificial production in providing for America's angling needs must be better defined. Stocking and production guidelines resulting from this survey are needed to keep up with the ever-increasing angling pressure while still maintaining or improving the quality of fishing," the Interior Secretary said.

Full cooperation from State game and fish departments was assured by the president of the International Association of Game, Fish, and Conservation Commissioners.



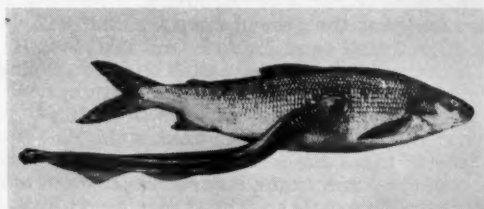
Great Lakes

LAKE TROUT FISHERY ENCOURAGED BY SEA LAMPREY DECLINE:

Prospects for restoring the multimillion-dollar lake trout fishing industry in the upper Great Lakes have become increasingly encouraging due to reduction in numbers of parasitic sea lamprey, Secretary of the Interior Stewart L. Udall said after reviewing latest statistics from the joint United States-Canadian control program.

During the spring of 1966, some 4,300 sea lampreys were captured at 16 checkpoints on the United States shore of Lake Superior, compared with 10,129 for a similar period a year earlier, according to Interior's Bureau of Commercial Fisheries. This represents the most dramatic decrease since the 80-percent reduction recorded in the 1-year period ending in 1962.

The number of spawning adult sea lampreys caught at electric barriers on streams tributary to Lake Superior during 1966 has been about 50 percent below the 1962-1965 level and indicates a reduction of about 90 percent from the average of 1957-61. A steady decline in sea lamprey catches also is reported for Lake Michigan streams.



Shows Great Lakes whitefish with sea lamprey attached to it.

In the program of chemically treating lamprey-spawning streams to destroy the trout predator while it is still in its larvae or ammocete form, about 75 percent of Lake Superior's infested tributaries have now had a second application of the lampicide. The first round of treatments for the 99 Lake Michigan streams was completed early in spring 1966 and the program is now under way in Lake Huron.

Some 4.8 million yearling lake trout are being planted in Lakes Superior (3.1 million) and Michigan (1.7 million) during 1966. This is the largest annual stocking to date and brings the total for Lake Superior to

about 15.7 million fish since rehabilitation of the lake trout fishery began in 1958.

The remarkable comeback of the lake trout attests to the success of the control efforts and replanting with hatchery-raised stock. Natural reproduction now is returning, the Bureau of Commercial Fisheries said, pointing out that in fall 1963, one of its research vessels made the first catch of natural (not produced in a hatchery) lake trout in Lake Superior since 1959. Also, the whitefish and rainbow trout fisheries have improved in Lake Michigan as an extra bonus of the war on sea lampreys.

The stocking program was initiated in Lake Michigan in 1965. For Lake Huron, plantings with selected hybrid splake (a combination of lake trout and speckled or brook trout) are being scheduled to coincide with the sea lamprey control program and are expected to get under way in 1969. This new species, developed by Canadian fishery scientists as a result of a decade of selective breeding research, is expected to offer a special advantage over the lake trout since it will mature and reproduce at an age of three years or earlier, before reaching the size at which it becomes vulnerable to sea lamprey predation. Lake trout become vulnerable at about four years of age, but do not mature and reproduce until seven years of age.

Efforts to find commercial uses for sea lampreys to compensate for the destruction they cause have been unsuccessful. They are unacceptable to Americans as a food, although they are eaten in many European countries. Analyses indicate that oil yield and Vitamin-A potential are much too low for commercial exploitation.

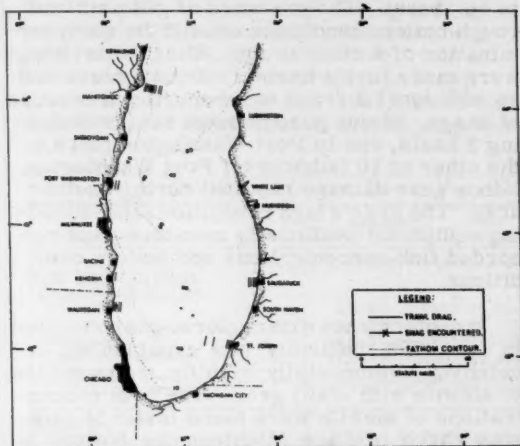
Note: See *Commercial Fisheries Review*, October 1965 p. 31.

Great Lakes Fisheries Explorations and Gear Development

SEASONAL DISTRIBUTION AND ABUNDANCE STUDIES OF ALEWIFE AND CHUB IN LAKE MICHIGAN CONTINUED:

M/V "Kaho" Cruise 33 (June 7-23, 1966): To further knowledge regarding the seasonal abundance, distribution, and availability of alewife and chub stocks, upon which the commercial fishing industry in Lake Michigan

has become more dependent since the deterioration of other prime fish stocks, was one of the objectives of this cruise by the exploratory fishing vessel *Kaho*. The vessel is operated by the Bureau of Commercial Fisheries, U. S. Department of the Interior.



Lake Michigan explorations by M/V *Kaho* Cruise 33 (June 7-23, 1966).

The Bureau, through various research and development studies, is striving to improve the economic utilization of alewife and chubs. The low-cost, high-volume production of those species by trawling makes it possible to use them for pet food, mink food, or fish meal. Such use is still increasing. In 1965, a total of 14.1 million pounds of alewife and 0.9 million pounds of chubs from Lake Michigan were used for that purpose.

The major objective of this cruise was monitoring the availability of the alewife population to bottom trawls at a time of the year when they become difficult to catch—especially on the west side of southern Lake Michigan. Special emphasis was placed on exploration of shoal water areas. Secondary functions of the cruise were to provide fish samples for studies in relation to pesticides and botulism, collect information on lake trout populations, obtain length and fin-clip records for each trout taken during the cruise, and preserve specimens for lake trout food studies conducted by the State of Michigan Conservation Department.

A total of 33 exploratory drags was completed in southern Lake Michigan during the

cruise. All drags were made with a 52-foot (headrope) Gulf-of-Mexico-type fish trawl. The majority of drags were of 30-minutes duration. A total of 5 drags were purposely shortened to 15-minute periods to check for alewife at depths where they were assumed to be absent. The presence of gill nets and rough bottom conditions caused the early termination of 4 other drags. Three short drags were made inside harbor entrance piers and an additional 3 drags were shortened because of snags. Major gear damage occurred during 2 hauls, one in Port Washington piers, the other at 10 fathoms off Port Washington. Minor gear damage resulted during another drag. The Kaho's high resolution echo-sounding equipment continually monitored and recorded fish concentrations and bottom conditions.

In conformance with explorations conducted in June 1962, difficulty was experienced in catching commercially-significant quantities of alewife with trawl gear. The best concentrations of alewife were found inside 10 fathoms where in Lake Michigan the bottom is usually too rough to permit effective bottom trawling. Commercially significant quantities of alewife amounting up to 1.8 tons an hour were taken off Benton Harbor, Waukegan, Kenosha, Milwaukee, and Port Washington, respectively. The catches, however, were much smaller than those obtained during earlier cruises in April and May 1966.

Unusually large catches of 450 and 500 pounds of yellow perch were made off Benton Harbor. Little effort was made to locate chubs during this cruise--the largest catch was 120 pounds.

Among other species caught in the trawl were smelt, sculpin, yellow perch, and lake trout.

Note: See Commercial Fisheries Review, August 1966 p. 29.



Great Lakes Fishery Investigations

BIOLOGICAL RESEARCH AND SEA LAMPREY CONTROL, JULY 1966:

Some of the highlights of Great Lakes biological research during July 1966 by the Biological Laboratory at Ann Arbor, Mich., operated by the Bureau of Commercial Fisheries, U.S. Department of the Interior:

Lake Superior research: The Biological Laboratory's research vessel Siscowet operated in western Lake Superior during July. Part of the cruise was in support of the University of Minnesota project under P.L. 88-309. Assessment of the abundance and distribution of lake trout also was carried out at that time. The catch per unit of effort was slightly higher than a year earlier. Two young-of-the-year lake trout were caught during trawling operations in the Apostle Islands region of the lake.

Lake Michigan research: Alewife larvae were abundant during July in the open waters of Lake Michigan off Saugatuck, Mich. They appeared to be confined to the upper few meters of water regardless of depth. Although they are found in the lake at very early stages of development, the pattern of movement would indicate there is little or no actual spawning in the lake off Saugatuck.

Further study by the Bureau's Biological Laboratory to determine the effect of temperature on alewife eggs revealed that hatching may occur over a wide temperature range (52-82° F.). Preliminary field observations indicate that the upper limit for hatching (82° F.) may be the temperature at which natural spawning is completely inhibited. All spawning activity in the Kalamazoo River ceased when water temperatures reached 82° F. All mature eggs taken from females inhabiting 82° F. water were dead and sperm from males was highly viscous and would not mix with water.

Lake Erie research: Assessment of the new year-class strength of various species in the western basin of Lake Erie was conducted during July. Results from trawling as of that time indicated the poorest survival of yellow pike and yellow perch in that area since 1957. The research vessel Musky II also was used in supporting the investigations conducted by the Laboratory's limnological study group off Lorain, Ohio.

Sea lamprey control: Seasonal operation of electric barriers in Lake Superior tributaries was terminated July 13. The adult sea lamprey counts at the assessment barriers declined significantly. Catches of spawning-run lampreys showed a 56-percent reduction from the previous 4-year average (10,825). At the end of the season the catch was 4,761 sea lampreys compared with 11,834 a year earlier.

Chemical treatment of lamprey-producing streams was restricted by low stream flows due to unseasonal drought conditions. Two streams were completed in July--Pine River in Mackinac County, Mich., a tributary of northern Lake Huron was treated for the first time and Sturgeon River in Delta County, a northern Lake Michigan stream, was re-treated. Except for major streams, the schedule of chemical treatment of lamprey-producing streams could be delayed on account of low water.



Industrial Fishery Products

U. S. FISH MEAL, OIL, AND SOLUBLES:

Production, May 1966: During May 1966, a total of about 19.1 million pounds of marine animal oils and 19,155 tons of fish meal was produced in the United States. Compared with

Product	May		Jan.-May		Total
	1/1966	1965	1/1966	1965	1965
..... (Short Tons)					
Fish Meal and Scrap:					
Groundfish	1,040	1,293	4,388	3,783	10,696
Herring	132	77	1,015	1,344	12,932
Menhaden 2/	14,742	18,779	18,832	26,287	175,959
Tuna and mackerel ..	2,561	1,624	11,923	8,690	25,399
Unclassified	680	3,330	1,617	6,209	17,360
Total 3/	19,155	25,103	38,775	46,313	242,346
Fish Solubles:					
Menhaden	5,980	7,961	10,193	10,126	73,181
Other	1,662	2,726	6,347	7,581	21,658
Total	7,642	10,687	16,540	17,707	94,839
..... (1,000 Pounds)					
Oil, body:					
Groundfish	131	177	637	611	2,441
Herring	3/	48	358	600	8,543
Menhaden 2/	18,370	22,353	23,020	32,302	175,202
Tuna and mackerel ..	375	259	1,632	1,295	4,793
Other (inc. whale) ...	198	319	494	816	4,521
Total oil	19,074	23,156	26,141	35,624	195,500

^{1/} Preliminary data.

^{2/} Includes a small quantity of thread herring.

^{3/} Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

Source: U. S. Department of the Interior, Bureau of Commercial Fisheries.

May 1965 this was a decrease of about 4.1 million pounds of marine animal oils and 5,948 tons of fish meal and scrap. Fish solubles production amounted to 7,642 tons--a decrease of 3,045 tons as compared with May 1965.

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-May 1966: Based on domestic production and imports, the United States available supply of fish meal for the first 5 months in 1966 amounted to 187,401 short tons--26,529 tons (or 12.4 percent) less than during the same period in 1965. Domestic production was 7,538 tons (or 16.3 percent) lower, and imports were 16,758 tons (or 10.1 percent) lower than in January-May 1965. Peru continued to lead other countries with shipments of 93,898 tons.

Item	Jan.-May		Total
	1966	1965	1965
..... (Short Tons)			
Fish Meal and Scrap:			
Domestic production:			
Groundfish	4,388	3,783	10,696
Herring	1,015	1,344	12,932
Menhaden	19,832	26,287	175,959
Tuna and mackerel	11,923	8,690	25,399
Unclassified	1,617	6,209	17,360
Total production 1/	38,775	46,313	242,346
Imports:			
Canada	17,905	17,020	43,830
Peru	93,898	141,119	209,801
Chile	30,011	3,908	5,651
Norway	33	-	78
So. Africa Rep.	1,000	700	5,100
Other countries	5,779	2,637	6,206
Total imports	148,626	165,384	270,666
Available fish meal supply ...	187,401	213,930	524,717
Fish Solubles 2/:			
Domestic production	16,540	17,707	94,839
Imports:			
Canada	743	766	1,488
Iceland	33	-	-
Other countries	2,302	2,240	3,650
Total imports	3,078	3,006	5,138
Available fish solubles supply ..	19,618	20,713	99,977

^{1/} Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

^{2/} Wet weight basis except for imports from South Africa Republic (included in "other countries").

Source: U. S. Department of the Interior, Bureau of Commercial Fisheries, and U. S. Department of Commerce, Bureau of the Census.

The United States supply of fish solubles during January-May 1966 amounted to 19,618 tons--a decrease of 5.3 percent as compared with the same period in 1965. Domestic production of fish solubles decreased 6.5 percent and imports of fish solubles increased 2.4 percent.



Inland Fisheries Explorations and Gear Development

OAHE RESERVOIR TRAWLING STUDIES CONTINUED:

Reservoir Research Vessel "Hiodon"
Cruise 7 (June 1966): To delineate areas for effective bottom trawling and collect catch and biological data was the purpose of these explorations in the Oahe Reservoir located on the upper Missouri River in North and South Dakota. Trawling operations by the reservoir fishery research vessel Hiodon, which is operated by the U. S. Department of the Interior's Bureau of Commercial Fisheries, were conducted in zones 1-6.

FISHING OPERATIONS: A total of 74 drags was made with 35, 45, and 52-foot (headrope) trawls. Drags totaling 51 were of 15 minutes duration, 5 of 10 minutes duration, and 18 of 5 minutes duration. A total of 7 of the drags was made at night. Another 9 drags were incomplete because of fouling of the net.

Seven drags were made for the primary purpose of effecting trawl modification and testing the results; 8 drags were made primarily for the collection of biological data; 17 drags were made to test for differences between day and night catches; and 42 drags were for exploration of trawling grounds and checking fish distribution.



Shows trawl containing catch being lifted aboard reservoir fishery research vessel Hiodon.

FISHING RESULTS: The 74 drags took a total of 8,702 adult fish weighing 7,853 pounds for an average of 118 fish or 106 pounds per drag. Carp comprised 77.4 percent of the catch by weight; yellow perch, 6.2 percent; bigmouth buffalo, 3.5 percent; and carp-suckers, 3.2 percent. Other species accounted for less than 2.0 percent of the catch.

A 45-foot headrope trawl required minor changes to correct a tendency toward twisting of the cod section. Correction was achieved by placing floats on the top side of the cod. The combination of experimentation and dragging on flats resulted in a low catch rate of only 39 pounds per drag. Species composition of the catch was 90 percent carp, 3 percent burbot, and 2 percent drum.

The 8 "biological drags" yielded a total of 1,400 fish that weighed 857 pounds for an average of 107 pounds per drag. Data relative to length-weight relationships, scale samples, and other biological information obtained was to be used in biological studies.

Ten daytime drags and 7 nighttime drags were made as an experiment to determine whether there is a significant difference in the rate of catch or species composition of catches made at different times of the day. During the cruise, drags made during daytime caught an average of 66 pounds a drag and nighttime drags caught an average of 82 pounds a drag. Carp made up 79 percent of the daytime catch (by weight) and 60 percent of the nighttime catch. Drum, carpsucker, bigmouth buffalo, and white crappie made up a slightly higher percentage of the night catches. Perch accounted for less than 2 percent of the daytime catch, but comprised 13 percent of the nighttime total.

Of some interest was the large increase in yearling fish caught at night. An average of 13 yearlings per drag entered the daytime catch as compared to 154 per drag at night. The large increase resulted primarily from the increased catch of yearling bullheads (2 per drag during daylight; 81 per drag at night), white crappie (5 - 37) and perch (2-26). Comparison of daytime and nighttime catches will continue through the 1966 field season program.

A total of 2,080 yearling fish was caught during the cruise. The species composition was 53 percent perch, 19 percent bullheads, 10 percent white crappie, 5 percent yellow pike (walleye), 4 percent sauger, 3 percent northern pike, and 2 percent white bass. Other species taken were goldeye, black crappie, drum, carp, carpsucker, channel catfish, and burbot.

Note: See Commercial Fisheries Review, August 1966 p. 34.

Maine Sardines

CANNED STOCKS, JULY 1, 1966:

Canners' stocks of Maine sardines on July 1, 1966, were down 42,000 cases from those of the same date in 1965, but were sharply lower as compared with the same date in the two previous years.

were down. U. S. per capita consumption of fishery products in 1966 will likely not exceed 10.9 pounds in view of slightly smaller production and population gains. In 1965, consumption of fishery products averaged 11.0 pounds per person, the highest since 1954.

Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, July 1, 1966, with Comparisons 1/

Type	Unit	1965/66 Season					1964/65 Season				
		7/1/66	6/1/66	4/1/66	1/1/66	11/1/65	7/1/65	6/1/65	4/1/65	1/1/65	11/1/64
Distributors	1,000 actual cases	195	208	234	267	289	194	198	236	238	291
Canners	1,000 std. cases 2/	253	248	312	520	689	295	203	314	538	629

1/ Table represents marketing season from November 1-October 31.

2/ 100 3 3/4-oz. cans equal one standard case.

Note: Beginning with the Canned Food Report of April 1, 1963, U. S. Bureau of the Census estimates of distributors' stocks were based on a revised sample of merchant wholesalers and warehouses of retail multiunit organizations. The revised sample resulted in better coverage. The January 1, 1963, survey was conducted with both samples to provide an approximate measure of the difference in the two samples. That survey showed that the estimate of distributors' stocks of canned Maine sardines from the revised sample was 13 percent above that given by the old sample.

Source: U. S. Bureau of the Census, Canned Food Report, July 1, 1966.

The 1966 pack of canned Maine sardines totaled 742,000 standard cases as of August 13, 1966, according to the Maine Sardine Council, as compared with 773,000 cases packed during the same period in 1965. Fishing was very spotty along the entire Maine coast during most of August and packing plants were working only a few days a week. Packers were hoping for improved supplies during September and October.

Preliminary data show the 1965 pack as 1,266,903 standard cases (100 cans 3 3/4-oz.) canned in 23 plants in Maine. That was 46.3 percent more than the 865,751 cases packed during 1964, when fishing was extremely poor. The 1965 pack was 21.8 percent less than the 1,619,235 cases in 1963.

New legislation permitting year-round canning of Maine sardines removed the traditional December 1 closing date for the packing season. The new legislation opened winter canning to all Maine sardine packers and allows winter canning with domestic as well as imported herring.

Note: See Commercial Fisheries Review, July 1966 p. 32.



Marketing

EDIBLE FISHERY PRODUCTS, MIDEAR 1966:

Indications about midyear 1966 were that supplies of edible fishery products may fall a little below those of a year earlier. Domestic production in 1966 probably will be slightly below the 1965 total; imports will be up substantially, but beginning 1966 stocks

Lower canned salmon supplies were anticipated for 1966 based on expectations of smaller salmon runs. However, salmon runs were surprisingly good and the 1966 salmon pack it was believed could well develop into a heavy one. Canned tuna may be less plentiful than in 1965. The early 1966 pack was above that of a year earlier because imports of raw tuna stocks ran especially heavy, but domestic landings have been lower. Inventories of canned tuna were lowered by heavy sales during 1965, and in view of growing consumer requirements and strong world demand, canners will be hard pressed to replenish inventories. Prospects were for a reduction in supplies of shrimp. Stocks were down appreciably at the beginning of 1966, landings in the Gulf of Mexico have been smaller, and imports have been running below a year earlier. Supplies of northern lobsters may also hold lower this year as compared with 1965. About the same quantity of flounder will be available this year, and halibut supplies will about equal 1965. But it appeared that scallops, haddock, and spiny lobster tails will be more plentiful this year.

Prices of fishery products generally increased during the first half of 1966. Continued high prices on most items are likely if demand continues strong and overall supplies hold a little below 1965.

As of midyear 1966, supplies of many popular fishery items were heavier than a year earlier. More cod fillets and steaks, more halibut, and more fish sticks and portions were on hand than at mid-1965, although cold-storage holdings of raw

headless shrimp and ocean perch fillets were down. Frozen stocks of crab meat, lobster tails, and scallops were above a year earlier. Stocks of canned pink salmon from the new season pack were up substantially from a year earlier, and there was some increase in stocks of canned chum and coho salmon.

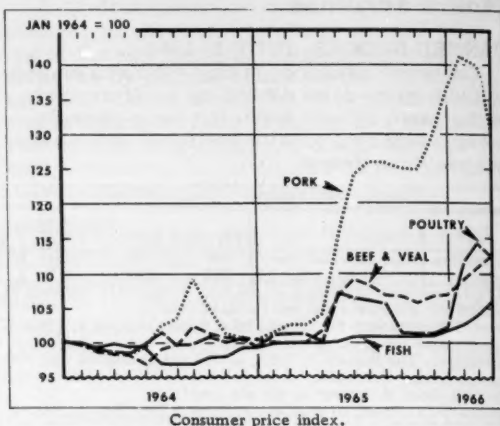
Note: This analysis was prepared by the Bureau of Commercial Fisheries, U. S. Department of the Interior, and modified from that published in the August 1966 USDA issue of the National Food Situation (NFS-117).

PRICE INCREASE IN 1965 MODEST FOR FISHERY PRODUCTS--HIGH FOR MEAT:

In 1965 the Bureau of Labor Statistics Consumer Price Index, commonly referred to as the "cost-of-living index" increased 1.7 percent from the previous year. Many of the 400 or so goods and services priced in the index contributed to this overall increase. However, much publicity has been given to the fact that one of the five major categories--food--contributed most to the overall increase in the Consumer Price Index. Most of the gain in food prices can be attributed to the rising cost of meats, poultry, and fish. Prices of those commodities rose 7 percent from 1964 to 1965. Only during the shortages in 1951 and 1952 have prices for meats, poultry, and fish averaged higher than in 1965.

Carrying the breakdown even further, pork had the largest gain in the red meats group averaging 13.8 percent higher in 1965, while beef and veal averaged 4.8 percent higher. Retail prices for poultry in 1965 increased 3.1 percent. The price increase for fish was the least of all--only 2.0 percent higher from 1964 to 1965. For each of these commodities, price gains were most pronounced during the last half of 1965.

What caused these sharp gains in 1965 compared with the relatively low prices which prevailed in 1964? Pork prices were up 14 percent over 1964 as a result of a 6½-pound cut in per capita supplies. For several years, pork prices had remained relatively low. Retail beef prices, responding to the generally tight meat supplies and strong demand, increased an average of 5 percent in 1965 even though per capita beef supplies were down only slightly. Despite substantially increased broiler supplies, retail prices averaged 3 percent higher in 1965. Prices for fishery products joined meat in the general advance during 1965 by increasing an average of 2 percent.



When April 1966 prices are compared with year earlier prices, meat prices rose more than fish prices--an 18-percent increase for meat as against a 5-percent increase for fish. The increase in meat prices accounted for nearly all of the 6 percent increase for total food. Pork led the rise with 28 percent, followed by beef and veal with 9 percent, and poultry with 8 percent.

For the remainder of summer 1966, it was conjectured that fish sales could benefit from continued high beef and pork prices. Retail prices for fishery products generally decline during the summer months due to the seasonal increase in supplies. (U. S. Bureau of Commercial Fisheries, Branch of Current Economic Analysis.)



Maryland

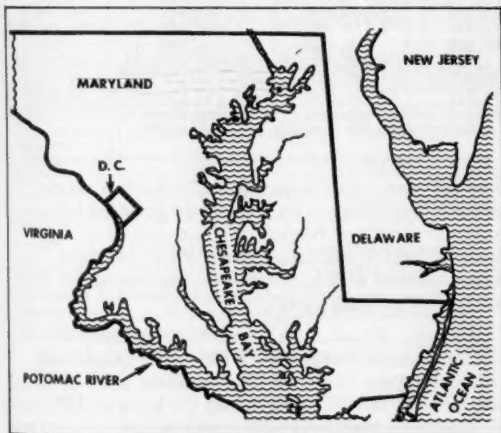
FISHERY LANDINGS AND TRENDS, 1965:

Landings of fish and shellfish at Maryland ports in 1965 totaled 86.6 million pounds with an ex-vessel value of \$13.2 million--an increase of 22 percent in quantity and 13 percent in value as compared with 1964. Blue crabs, oysters, menhaden, and soft clams accounted for 68 percent of the 1965 catch.

Crabs: Hard blue crab landings totaled 32.0 million pounds in 1965, an increase of 6.8 million pounds. This was a record-high year for hard crabs--the previous record was 31.6 million pounds landed in 1930. Crab ex-vessel prices varied from a high of \$10 a barrel in April to \$4 a barrel in August for picking crabs.

Soft and peeler blue crab landings in 1965 totaled 898,000 dozen, 23 percent below 1964.

Oysters: Landings improved over 1964 making a gradual recovery from the record-low catch of 1963. There were 1,845,800 U. S. bushels landed--an increase of 157,000 bushels or 9 percent over 1964. Oysters were the second most important species in quantity landed, but were the leading species in value (an estimated \$6.4 million). The spring catch was below the same period of the previous year and as a result packers purchased shell oysters from Gulf States to supply orders. The last three months of the season improved as harvesting increased and some oyster bars that were closed for many years were reopened by the State. Also, results of the State's shell and seed-oyster planting program were beginning to appear. Ex-vessel prices ranged from \$2.50 to \$4.50 a bushel in the spring to \$2.50 to \$6.75 a bushel in the fall. Gallon and bushel prices for standards and selects were lower in the spring (\$6.00 to \$7.50) and in the fall prices were higher.



Maryland fishing areas.

The past three dry years affected oysters by raising the salinity of the water in Maryland's portion of the Chesapeake Bay and the spread of the MSX organism was accelerated.

Soft Clams: Landings of soft clams totaled 637,900 bushels--a 6-percent decrease from 1964. Ex-vessel prices were fairly constant at \$2.50 a bushel throughout the year. The controversy over clamming regulations in the Potomac River was resolved in February 1960. The Potomac River Fisheries Commission was given authority and a 40-bushel-

per day limit was placed on clams which is consistent with the rest of the State. The Potomac River, as in 1964, produced 31 percent of the soft clam catch.

Finfish: Maryland landings of finfish in 1965 totaled 35.0 million pounds valued at \$1.6 million, as compared against 28.2 million pounds with a value \$1.5 million in 1964. The 1965 landings of menhaden (8.3 million pounds) and scrapfish (12.7 million pounds) accounted for much of the increase.

Landings of striped bass--Maryland's leading foodfish--dropped from 3.3 million pounds in 1964 to 2.9 million pounds in 1965. The white perch catch of 1.4 million pounds was up sharply from the 638,200 pounds landed in 1964. Landings of alewife (2.1 million pounds) were also up. There was a large increase in the 1965 shad landings (1.3 million pounds) and fluke landings (733,886 pounds) were up slightly.

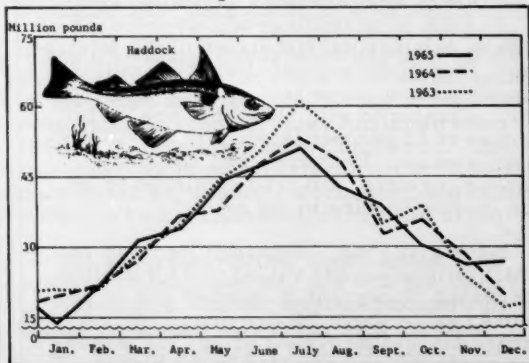
In 1965, two tuna purse-seine vessels landed 824,000 pounds of bluefin and 8,000 pounds of skipjack tuna. The Atlantic Coast tuna fishery was less active than in 1964.



Massachusetts

FISHERY LANDINGS, 1965:

Landings of fish and shellfish in Massachusetts during 1965 totaled 408.7 million pounds valued at \$40.6 million--a drop of less than 1 percent in quantity, but an increase of 15 percent in value from 1964. Fishermen landed 36 percent of the year's total catch at the port of New Bedford, 30



Massachusetts landings by months, 1963-1965.

Summary of Massachusetts Landings, 1965 and 1964

Species	1965		1964	
	Quantity Pounds	Value \$	Quantity Pounds	Value \$
Alewives, round	6,336,200	71,292	3,998,630	39,985
Cod, drawn	27,259,385	2,577,660	29,504,382	2,363,568
Cusk, drawn	1,652,978	113,401	1,683,995	98,107
Flounders, round	16,445,012	1,746,178	13,809,239	1,317,585
Dab	7,015,709	622,159	5,530,718	376,816
Fluke	405,721	126,432	1,358,228	441,591
Gray Sole	3,264,741	377,017	2,906,383	317,347
Lemon Sole	1,897,317	404,384	2,083,829	426,909
Yellowtail	70,888,231	6,712,605	70,933,339	4,876,011
Haddock, drawn	115,629,799	13,423,369	114,261,114	11,556,406
Hake:				
Red, round	2,379,350	29,204	2,875,870	32,790
White, dressed	1,541,784	155,334	2,426,103	176,677
Halibut, drawn	199,789	81,547	196,699	71,698
Herring, sea, round	4,442,705	69,749	1,962,969	36,954
Mackerel, round	1,828,912	127,106	2,725,435	172,224
Ocean Perch, round	23,293,505	1,014,005	30,331,669	1,280,520
Ocean Pout, round	728,010	9,925	2,453,115	32,625
Pollock, drawn	9,351,612	670,535	10,557,807	612,498
Swordfish, dressed	381,006	117,074	870,522	308,396
Tuna, round:				
Bluefin	2,381,737	143,760	2,058,223	143,482
Skipjack	5,000	500	1,154,040	84,269
Unclassified	210,000	18,990	-	-
Whiting:				
round	44,671,732	1,301,958	56,303,425	1,215,270
dressed	139,260	7,582	1,057,690	47,556
Wolfish, drawn	469,565	30,014	666,938	36,637
Unclassified fish	51,116,189	1,080,854	32,380,441	767,505
Lobster, northern	2,472,985	1,403,349	1,694,511	898,745
Shrimp	17,685	2,249	6,925	916
Sea scallop meat	11,871,791	8,028,661	13,603,835	7,446,109
Squid	436,002	30,933	234,140	11,245
Total	408,733,712	40,557,826	409,630,214	35,190,441

Note: Includes all landings in Massachusetts except for a small quantity taken in inshore fisheries. The landings shown for 1964 accounted for 93.2 percent of the Massachusetts total catch. The weights shown represent the fresh fish as landed and the values are those received by the vessels.

percent at Gloucester, 25 percent at Boston, and 9 percent at other Massachusetts ports.



Mississippi

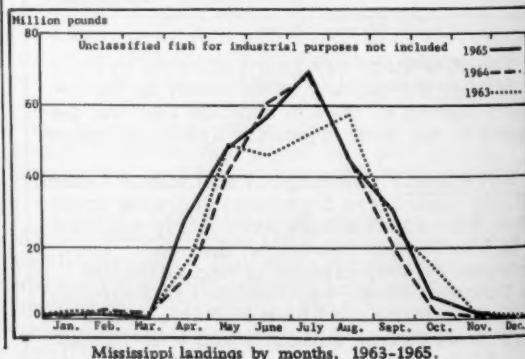
LANDINGS AND FISHERY TRENDS, 1965:

In 1965, total landings of fish and shellfish by commercial fishermen of the Mississippi Gulf Coast amounted to 368.4 million pounds with an ex-vessel value of \$9.3 million. Compared with 1964, that was an increase of 11 percent in quantity and 15 percent in value. Menhaden, red snapper, shrimp, oysters, and crab continued to be the leading species in the catch.

Industrial Fish: Menhaden landings of 278.1 million pounds valued at \$4.0 million increased 17 percent in quantity and 27 percent in value above the previous year. A strong market increased prices for menhaden products, and resulted in the higher

value for the year's catch. Menhaden were caught from the usual areas with good catches from Mississippi Sound. Otter-trawl caught industrial fish landings were 74.0 million pounds valued at \$1.3 million--6 percent less than the previous year.

Finfish: Food fish landings totaled 3.6 million pounds valued at \$720,000. Catches of red snapper (2.4 million pounds valued at \$589,000) were 28 percent above 1964.



Landings of spotted sea trout were about the same as 1964. Black and red drum landings decreased. Bluefish landings were 72,300 pounds--4 times greater than in 1964. Flounder landings were 21 percent greater than in 1964.

Mississippi Landings, 1965 and 1964				
Species	1965		1964	
	Qty. Lbs.	Value \$	Qty. Lbs.	Value \$
Fish				
Bluefish . . .	72,350	8,228	14,630	1,463
Cabio	220	18	900	71
Croaker . . .	-	-	500	30
Drum:				
Black	33,120	2,193	45,730	3,060
Redor				
Redfish . . .	32,600	4,783	49,950	7,187
Flounders . .	69,260	9,206	57,345	7,810
Groupers . . .	321,910	34,939	268,350	29,302
King whiting				
or kingfish .	271,130	16,185	322,960	19,802
Menhaden . .	278,104,210	3,972,568	237,832,600	3,131,440
Mullet	240,800	12,494	249,530	12,391
Pompano . . .	60	6	200	100
Sea catfish . .	20,110	923	16,650	836
Sea Trout:				
Spotted . . .	148,560	37,138	148,130	30,522
White	27,150	1,685	26,150	1,399
Sheepshead . .	25,520	1,965	49,300	3,847
Snapper, red .	2,365,320	589,470	1,849,190	460,872
Spanish mack-				
erel	3,220	337	660	62
Spot	5,700	342	7,200	540
Unclassified,				
Industrial . .	74,020,900	1,292,576	78,425,210	1,348,925
Total Fish . .	355,762,140	5,985,056	319,365,185	5,059,659
Shellfish				
Crabs, Blue:				
Hard	1,692,120	130,600	1,285,980	81,610
Soft and				
peeler . . .	1,400	210	1,700	252
Shrimp,				
heads-on . .	8,232,989	2,522,758	6,416,024	1,804,829
Oysters . . .	2,695,265	626,796	4,828,600	1,098,736
Total Shell-				
fish	12,621,774	3,280,364	12,532,304	2,985,427
Grand Total . .	368,383,914	9,265,420	331,897,489	8,045,086

Note: The catch of oysters and shrimp taken in Louisiana waters but landed in Mississippi is included. Oysters are reported in pounds of meats (8.75 pounds per gallon). All other species are shown in round weight.

Shellfish: Shrimp landings (8.2 million pounds, heads-on weight) valued at \$2.5 million, increased 28 percent in quantity and 40 percent in value from 1964. Good catches were made from the offshore areas adjacent to Horn and Ship Islands and the inside areas of Mississippi Sound. As in the 1964 season, the summer brown shrimp season in 1965 accounted for most of the annual production with 6.2 million pounds landed--75 percent of the total landings for the year. Demand for shrimp by canners remained strong during the season and higher prices were paid. Oyster landings of 2.7 million pounds of meats were 44 percent less than in 1964--the first sharp decrease noted since 1962. Production in the spring months from public and private reefs in Louisiana waters was

steady, but less than the previous year. Prices for raw oysters increased sharply after the hurricane "Betsy" because dealers were unable to get adequate supplies. At the end of the year prices of raw oysters were 20 to 30 percent higher than in the same period of 1964.

Hard blue crab landings of 1.7 million pounds increased 32 percent above the previous year and marked the third year of increased catches. Crab prices were up during the year and with a good market for crabmeat, processors worked at full capacity. Local canning plants used the surplus meat and had good inventories of canned crab meat by the end of the year.

Several new vessels joined the fisheries in 1965. Boatyards were busy with orders for a variety of new wood and steel vessels. New vessels were generally large with more engine power and with steel used mainly in the larger-sized vessels. At the end of 1965, the demand for vessel construction was more than boatyards could handle with resultant lags in completion dates and higher prices.

The commercial fishing industry was greatly affected by hurricane "Betsy," with 2 small shrimp and oyster canning plants damaged beyond repair. One petfood plant was damaged and out of operation for nearly 6 weeks and a shrimp and oyster unloading facility was destroyed.



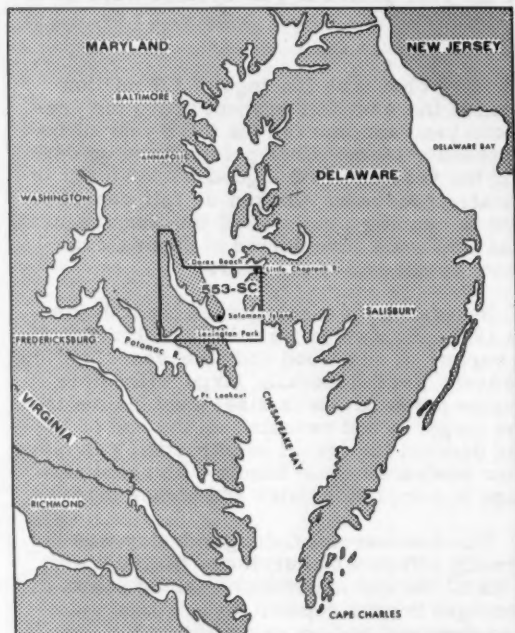
Nautical Charts

NEW CHART ISSUED FOR CHESAPEAKE BAY:

A new small craft nautical chart covering the entire width of Chesapeake Bay between the Patuxent and Little Choptank Rivers was issued by the Coast and Geodetic Survey of the Environmental Science Services Administration (ESSA), U. S. Department of Commerce. The new chart will provide navigators with tide and current tables, weather information, and a tabulation of facilities available for small craft.

The accordion-folded chart spans "the heart of Chesapeake Bay and will aid many of Maryland's 77,000 registered boaters in safely navigating this area" said the chief of the Survey's Marine Chart Division. He added that the new chart will enhance the

recreational value of a "picturesque and historic area." The chart, identified as Chart 553-SC, is described as "a basic document for navigating the area."



Nautical chart covering the Chesapeake Bay (area indicated by the box).

The chart can be purchased for \$1 from nautical chart agents or at a 20-percent discount if ordered in lots of 10 or more from the Coast and Geodetic Survey, Washington Science Center, Rockville, Md., 20852, where individual copies may also be obtained.

* * * * *

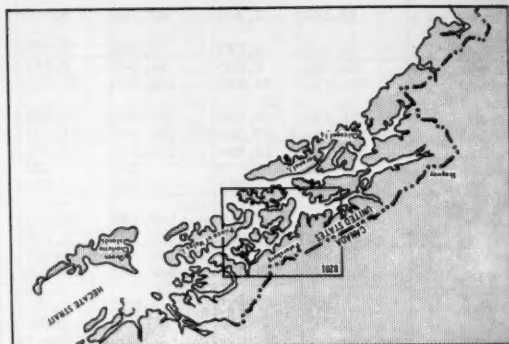
NEW CHART ISSUED FOR SOUTHEAST ALASKA:

A new edition of a nautical chart covering part of southeast Alaska was issued by the Coast and Geodetic Survey, an agency of the U. S. Department of Commerce's Environmental Science Services Administration (ESSA). Nautical charts are important to fishing interests in the area, as well as to its timber and mining industries which must transport their products by sea.

The chart, the first new edition of Chart 8201 in more than three years, covers southeast Alaska from Etolin Island to Midway Is-

lands, including Sumner Strait. It is the 12th edition of the chart (first issued in 1888).

The new edition includes the results of recent hydrographic and topographic surveys, and shows changes in the area during the past three years. Included for the first time in the chart is an inset of Duncan Canal in the vicinity of Big Castle Island based on 1965 hydrographic and topographic surveys. The inset is more than 10 times larger in scale than the base chart.



Nautical chart covering southeast Alaska (area indicated by the box).

Chart 8201 provides coverage for the primary shipping routes of fishing vessels which operate in southeast Alaska. In 1965, about 484 million pounds of fish and shellfish valued at some \$72 million were marketed by Alaskan fishermen.



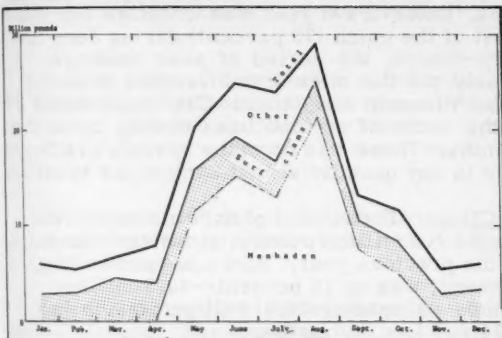
New Jersey

FISHERY LANDINGS, 1965:

Summary: Landings of commercial fish and shellfish in New Jersey during 1965 totaled 159.9 million pounds with an ex-vessel value of \$11.3 million--an increase of 15 percent in quantity and 20 percent in value compared with 1964. Menhaden landings were up 10.0 million pounds, and surf clams were up 5.5 million pounds. There were appreciable increases in landings of sea scallops, swordfish, scup, whiting, blue crabs, and bluefish.

Following are some of the highlights of the New Jersey fisheries during 1965:

Industrial fish: Menhaden production made a very slow comeback after a disastrous year in 1964. Landings for 1965 were up 10.0 million pounds, but in this high volume industry the catch of 74.4 million pounds, worth \$1.3 million, is still considered poor. Landings in 1963, although not a peak year, were 178.4 million pounds valued at \$2.2 million. In past years the industry in New Jersey had annual harvests that were as high as 486 million pounds. Only 1 of the reduction plants in New Jersey processed menhaden during the entire 1965 season.



New Jersey landings by month, 1965.

Surf Clams: Landings were in record quantities. In 1965, total landings exceeded the 1964 catch by about 5.5 million pounds of meats. A total of 4 vessels was added to the surf-clam fleet, bringing the total to about 60 vessels. Increased production was due to: virgin surf-clam grounds located off Wildwood, no labor disputes, and favorable weather. Because of the increasing sales of clam products, production of that species has steadily increased since 1952.

Sea scallops: Landings reached an all-time high of 1.9 million pounds, averaging 60.8 cents a pound. Most of the scallops were taken in an area off Cape Henry, Va., where vessels from Canada to the Carolinas operated. During the period of peak catches, June-September, landings of 10,000 to 30,000 pounds of meats per trip were common. In July one vessel caught 36,800 pounds on one trip.

Swordfish: In New Jersey, swordfishing is a new and somewhat unexploited fishery. Now 3 years old, it is strictly a long-line operation. The 5 vessels engaged in this fishery landed 1.0 million pounds or 694,000 pounds more than in 1964.

Scup: This fishery continues to lead in total landings of edible finfish. Scup may well be considered the backbone of the New Jersey fishery. Otter-trawl catches in the fall and winter months were exceptionally good and totaled 80 percent of the annual scup landings.

Whiting: This fishery is becoming more prominent in New Jersey. Previously no great effort was made to catch large quantities of whiting because local fishermen were unable to compete with the whiting fishery in the New England States. As this species was somewhat scarce in New England waters, there was a greater demand during the year.

Blue crabs: Landings were up 347,000 pounds in 1965, due to the unusually good catches made by the crab pot fishery in Delaware Bay during August and September. This area produced 81 percent of the total. The remaining 19 percent was caught by crab dredges in Sandy Hook, Raritan and Barnegat Bays.

Tuna: Purse seiners from Massachusetts and California operating out of New Jersey experienced a disappointing season. Since the start of this fishery in 1963, first landings were usually made during June and the season lasted 3 months. In 1965, no fish were caught until mid-July and the last trip was made by August 1. The State's ports are centrally located to important wholesale markets and transportation is readily at hand, but tuna vessels are handicapped by the lack of large, deep inlets, and sufficient unloading and storage facilities. The 1965 landings of tuna amounted to 1.3 million pounds compared to 2.8 million pounds in 1964.

Oysters: Production was down by almost 600,000 pounds as the State did not open the public seed beds located at the mouth of the Delaware River. The normal practice is to plant seed oysters on private grounds and allow them to grow for 3-4 years prior to harvesting. The high incidence of MSX disease in the growing areas requires that harvesting be at the earliest possible moment--within the same calendar year or no later than 1 year after planting. As the main seed beds were closed in 1965, the only sources of oysters were: the remaining oysters obtained from the public seed beds in 1964; about 12,000 bushels of seed taken by tongers from minor seed beds opened by the State in 1965;

and a small quantity on privately-owned beds. During the past ten years, production of oysters has been governed by the amount of seed available from the State's natural seed beds. The State has not opened the seed beds every

New Jersey Landings, 1965 and 1964				
Species	1965		1964	
	Qty.	Value	Qty.	Value
Fish	Lbs.	\$	Lbs.	\$
Bluefish	817, 137	12, 335	541, 000	87, 043
Butterfish . . .	1, 138, 123	91, 267	1, 187, 200	132, 938
Cod	164, 286	28, 311	283, 000	44, 974
Fluke	3, 612, 738	855, 775	3, 670, 500	865, 495
Menhaden . . .	74, 362, 219	1, 270, 649	64, 278, 700	969, 552
Scup or porgy .	9, 089, 953	887, 316	8, 551, 000	847, 326
Sea Bass	2, 145, 977	344, 309	2, 194, 900	335, 309
Striped Bass . .	779, 694	166, 165	995, 600	174, 057
Swordfish . . .	1, 000, 553	437, 987	306, 900	103, 338
Tuna:				
Bluefin	1, 260, 557	84, 897	2, 758, 300	139, 104
Whiting	3, 727, 882	156, 319	3, 270, 800	153, 836
Other fish . . .	12, 194, 027	306, 724	8, 250, 300	303, 434
Total fish . .	110, 293, 146	4, 742, 054	96, 288, 200	4, 156, 406
Shellfish, etc.				
Crabs:				
Blue:				
Hard	892, 100	95, 468	569, 500	81, 487
Soft	34, 045	8, 839	9, 600	1, 919
Rock	60, 257	2, 231	44, 800	1, 515
Horseshoe . . .	211, 600	1, 058	354, 000	1, 594
Lobsters	1, 018, 859	562, 276	1, 060, 600	516, 301
Shrimp	1/	1/	2, 400	2, 400
Clams:				
Hard	1, 869, 970	858, 767	1, 894, 000	820, 169
Soft	33, 648	14, 020	21, 500	8, 965
Surf	42, 306, 687	3, 047, 857	36, 875, 200	2, 503, 719
Conchs	183, 500	48, 385	190, 900	39, 076
Mussels, sea . .	1/	1/	600	300
Oysters	502, 659	681, 319	1, 097, 700	1, 024, 410
Scallops:				
Bay	95, 533	45, 000	376, 300	154, 911
Sea	1, 895, 979	1, 152, 610	140, 300	79, 756
Squid	453, 017	32, 718	376, 900	21, 735
Terrapin, diamond-back .	1/	1/	3, 900	1, 365
Turtles	1/	1/	55, 900	6, 585
Total shellfish, etc.	49, 557, 854	6, 550, 548	43, 074, 100	5, 266, 207
Grand total . .	159, 851, 000	11, 292, 602	139, 362, 300	9, 422, 613
1/ Not available.				
Note: Data for 1964 are revised. Univalve and bivalve mollusks are reported in pounds of meats. All other species are shown in round weight.				

year and this has been the main cause of year-to-year fluctuations in production.

Bay Scallops: Catches dropped sharply from 1964. The failure was attributed to the abundance of weed growth, usually removed by northeast storms in the fall months. There were no storms, however, and dredges picked up large quantities of seaweed, thus limiting the fishery.

Shad: Fish were caught by drift and stake-gill nets mainly in the Delaware Bay and Hudson River during the spring. There was good fishing in the Hudson River the last week in April and the first week in May, but

the catch did not meet fishermen's expectations. Fishing effort was less than in 1964 and was partially responsible for the poor catch. Delaware Bay stake-net fishermen were just able to show a profit from the catches in 1965. Those fishermen would have made larger catches if prices for shad had been higher. Many fishermen quit fishing weeks before the run of shad ended.

Striped Bass: This was the second best year with landings of about 800,000 pounds--216,000 pounds below the record year of 1964. Otter-trawl year was credited for most of the catch (70 percent) during January-March, the period of peak landings. Nearly all the otter-trawl vessels from Point Pleasant and Atlantic City contributed to the catch of striped bass during those months. There was no other species available in any quantity at that time of the year.

Clams: Production of hard clams in 1965 totaled 1.9 million pounds, about the same as the previous year. Surf clam production, however, was up 15 percent--42.3 million pounds as against 36.9 million pounds in 1964.



North Atlantic Fisheries Investigations

DISTRIBUTION OF BRIT HERRING STUDIED:

M/V "Rorqual" Cruise 5-66 (June 22-30, 1966): To search for and sample "brit"-size herring (2 to 3 inches) and sardine-size herring schools was the objective of this cruise by the research vessel Rorqual, operated by the Bureau of Commercial Fisheries, U. S. Department of the Interior. The area of operations was Saco Bay to Machias Bay (Gulf of Maine)--inshore to 5 fathoms and offshore to 50 fathoms.

Surveys during the cruise were made with an echo sounder and traces were sampled with a high-speed trawl and an otter trawl. The areas surveyed and the results obtained were as follows:

Casco and Saco Bays (depth 10-20 fathoms, daytime)--there were no traces of herring and net tows did not catch any; offshore Casco and Saco Bays (depth 20-50 fathoms, night)--no traces of herring were found.

Sheepscot Bay (depth 10 fathoms, night)--traces of herring, mixed catch of brit, and sardine-size herring were found.

Inshore and thoroughfare waters from Muscongus Bay to Machias Bay (depth 5-10 fathoms, daytime)--continuous traces were identified as brit herring.

Southwest Harbor to Petit Manan Island (depth 5-30 fathoms, daytime)--no herring were found.

Machias River (depth less than 5 fathoms, night)--there was a school of sardine herring.

Offshore waters from Cutler to Schoodic Pt. (depth 20-50 fathoms, night)--there were no traces. Schoodic to Southwest Harbor (depth 5-20 fathoms, daytime)--there were scattered traces, not identified.

Boothbay Harbor (depth 5-15 fathoms, night)--there were traces of what apparently were brit herring.

Surface salinity and temperature data were collected. The thermograph was run continuously.

LOBSTER AND SEA HERRING POPULATION STUDIES CONTINUED:

R/V Albatross IV Cruise 66-8 (June 15-25, 1966): To sample populations of lobsters and sea herring and obtain related environmental data was the main objective of this cruise by the Bureau of Commercial Fisheries research vessel Albatross IV. Other objectives were to obtain blood samples from lobster and sea herring and make plankton tows for lobster and herring larvae. The canyons along the Continental Shelf from Veatch Canyon east to Corsair Canyon, general area of Georges Bank, and Cashes Ledge were the areas of operations.

FISHING OPERATIONS: Lobster: A total of 38 trawl sets was made at the 4 major lobster stations. The sets made in waters of 68 to 160 fathoms yielded 580 lobsters (59 percent females and 41 percent males). A total of 73 of the females were berried. The average weight of the lobsters was 3.4 pounds, the range in weight 0.1 to 25 pounds. Seven lobster pots set on Cashes Ledge were hauled 4 days later and contained 27 lobsters (10 females and 17 males). The average weight

of the lobsters was 1 pound ranging in weight from 0.4 to 6 pounds. Large lobsters were prevalent in the catches from Lydonia, Oceanographer, and Corsair Canyons, while short lobsters were prevalent in the catches from Veatch Canyon. A total of 278 lobster blood samples was obtained for analysis.

Herring: Six herring trawl sets were made at 6 stations. The sets (1-hour duration) made in waters of 30 to 40 fathoms yielded a total of 29 bushels; the herring were from 25.4 to 34.6 centimeters (about 10.0 to 13.6 inches) long. The majority of herring in the samples were from the 1960 and 1961 year-classes. A total of 50 blood samples were obtained for analysis. Species of fish, other than herring, collected during the cruise were haddock (30 bushels), cod (3 bushels), yellowtail (1 1/4 bushels), ocean perch, (11 1/2 bushels), gray sole (3 bushels), white hake (2 bushels), alewives (1 bushel), dogfish (3 1/2 bushels), skates (3 bushels), silver hake (2 bushels), mackerel (1 bushel), sculpin (4 bushels), goosefish (4 bushels), pollock (1 bushel), and eel pout (2 bushels). One bushel of squid and 1/2 bushel of shrimp also were obtained in the catches.

PLANKTON OPERATIONS: During the cruise 26 one-meter net plankton tows of 15 minutes each were made (5 minutes at 20 meters, 5 minutes at 10 meters, and 5 minutes at the surface). No larval herring were obtained.

HYDROGRAPHIC OBSERVATIONS: Seabed drifters and drift bottles were released at selected stations along the Continental Shelf. At each trawl station bathythermograph (BT) casts were made, salinities collected, and weather observations recorded.

Note: See Commercial Fisheries Review, July 1966 p. 37.



North Pacific Fisheries Explorations and Gear Development

PELAGIC FISHING GEAR RESEARCH:

M/V "Commando" Cruise 13 (June 5-21, 1966): The exploratory fishing vessel M/V Commando, chartered by the U. S. Department of the Interior's Bureau of Commercial Fisheries, returned to Seattle, Wash., on June 21, 1966, after completing a 16-day

cruise in Puget Sound and northern Oregon coastal waters.

The primary objectives of the cruise were to: (1) develop a method of fishing a dandyline-rigged small-mesh 94-foot fish trawl with a single towing warp; (2) assess the intra-station variability in composition of fish and shellfish catches associated with a series of replicate tows made at the 300 and 375 fathom stations on the trackline southwest of the Columbia River mouth; and (3) collect additional data on the composition, distribution and abundance of demersal fish species at stations deeper than 450 fathoms on the Columbia River trackline using the small-mesh 94-foot fish trawl and 70-foot shrimp trawl.

GEAR: The following trawls were fished using V-type otterboards and either a single or double warp trawling arrangement: (1) standard 400-mesh (94-foot) commercial Eastern otter trawl with no liner in the codend, (2) 70-foot semi-balloon Gulf of Mexico shrimp trawl and (3) 94-foot small mesh fish trawl. The latter trawl had essentially the same physical dimensions as the 400-mesh commercial Eastern otter trawl. The major difference was in the smaller mesh sizes which were $2\frac{1}{2}$ inches in the wings and square and $1\frac{1}{2}$ inches in the belly, intermediate, and codend. Because of the great depths to be fished, 4- and 8-inch glass floats were used on headropes of all trawls. The 10-fathom danleanos which consisted of 7-fathom cables from the doors to the butterfly with 3-fathom legs from the butterfly to the net were used in conjunction with the above trawls.

METHODS OF OPERATION: The double warp trawling operation was conducted in the standard manner. The single warp operation was modified to permit the use of the danleanos. Both doors were hung from the starboard stanchion and the 50-fathom bridles from the doors to the single towing warp were wound on the main winch. The 10-fathom danleanos and trawl were wound on a reel on the stern of the vessel. After the trawl and danleanos were payed out from the reel, they were connected to the doors by extensions from the back of the doors. Both towing warps were connected end to end to permit trawling at depths greater than 500 fathoms.

RESULTS: A total of 24 drags--8 with the 94-foot small-mesh fish trawl, 10 with the 400-mesh Eastern fish trawl, and 6 with the

70-foot shrimp trawl--were made during the cruise.

GEAR EVALUATION: SCUBA-equipped divers observed the 94-foot small-mesh version of the 400-mesh Eastern fish trawl rigged with 10-fathom danleanos, V-type doors, and 90-foot "tickler" chain attached to the footrope, to evaluate its fishing configuration in 10 fathoms of water. In general, the fishing configuration of the net was good with a horizontal measured spread of 29 feet between wing-tips, and an estimated height of 10 feet at the center of the net and 6 feet at the wing tips. The "tickler" chain was 4 to 10 inches off bottom at the center part of the net and on bottom along the wings. Along the wings the "tickler" remained under or slightly behind the footrope, but at the center the "tickler" was in front of and at about a 45° angle to the footrope. The butterfly part of the danleano remained upright at all times. A tension of 3,500 pounds as measured by a dynamometer was exerted on the main towing cable during the experiments.

REPLICATE SERIES EXPERIMENT: Two series of replicate tows (6- and 4-one-hour tow series) were made with the 400-mesh commercial Eastern otter trawl southwest of the Columbia River mouth at 268-310 and 358-394 fathoms, respectively. The results indicate that at the depths sampled, species dominance in the catches remains the same and the size of catches of the dominant species do not vary excessively. For instance, at 268-310 fathoms, catches per hour of sablefish (*Anoplopoma fimbria*) ranged from 400 to 1,600 pounds, Dover sole (*Microstomus pacificus*) from 35 to 300 pounds, channel rockfish (*Sebastes alascanus*) from 20 to 50 pounds, and Tanner crabs (*Chionoecetes tanneri*) from 30 to 65 pounds. At 358-394 fathoms the catches per hour were less variable, with sablefish (725 to 1,000 pounds), Dover sole (70 to 100 pounds), channel rockfish (105 to 180 pounds), and Tanner crabs (115 to 182 pounds).

DEEP-WATER EXPLORATIONS: A total of 5 drags at depths greater than 500 fathoms was made southwest of the Columbia River mouth. Three of the drags were made with the 94-foot small-mesh fish trawl at depths of 500, 600-710, and 820-840 fathoms yielding catches of 84, 614, and 1,024 pounds, respectively. The towing time of the 3 drags were $\frac{1}{2}$, 2, and 3 hours, respectively. The 2 drags made at 500 and

1,160 fathoms with the 70-foot shrimp trawl resulted in catches of 407 and 314 pounds in 1.0 and 1.2 hours of towing, respectively. The tow at 1,160 fathoms was the deepest made on the Columbia River trackline. A scope ratio of only 1.4:1 was successful.

The deep-water catches consisted largely of rattails (*Coryphaenoides acrolepis* and *pectoralis*), longfinned cod (*Antimora rostrata*), and channel rockfish (*Sebastes alivivus*). An exception to this pattern was a 407-pound catch made at 500 fathoms containing 300 pounds of sablefish averaging 52 centimeters (21 inches) in length.

Difficulty was experienced in retrieving the 94-foot small-mesh fish trawl and 70-foot shrimp trawl from deep water. On two occasions ruptured hydraulic lines interrupted the hauling operation.

OTHER SAMPLING AND OBSERVATIONS: Two tows of 1.0 and 1.5 hours duration made with the 70-foot shrimp trawl at 122 and 98-101 fathoms, respectively, yielded catches of less than 50 pounds. Pacific ocean perch dominated those catches. Two other tows with the same gear at 11-14 fathoms yielded 293 and 331 pounds in 0.3 and 0.4 hours of towing, respectively. Hake was the principal species in the latter two hauls.

Note: See *Commercial Fisheries Review*, February 1966 p. 27.



Oceanography

INTERIOR DEPARTMENT NAMES RESEARCH OCEANOGRAPHER TO COORDINATE EASTROPAC EXPEDITION:

Dr. Warren S. Wooster of the University of California was named by the Department of the Interior's Bureau of Commercial Fisheries to coordinate the largest exploratory oceanographic expedition ever planned in the eastern tropical Pacific (EASTROPAC); it was announced July 14, 1966.

Dr. Wooster, internationally recognized research oceanographer, teacher, and administrator, is a professor at the University's Scripps Institution of Oceanography at La Jolla, Calif., and will continue some of his academic duties while on special assignment with the Bureau.

Wooster will be coordinator for EASTROPAC, the designation for the coming multi-

agency investigation of the oceanic region stretching south from San Diego, Calif., to northern Chile and westward for 2,000 to 4,000 miles, said Donald L. McKernan, Bureau Director. The main purpose of the project, which will begin in early 1967 and continue for about 18 months, will be to gain knowledge of climatic variations in the region and their bearing on fishery resources. The Bureau Director said, "The solution of many problems relating to fisheries, weather forecasting, and defense depends on an understanding of the changing ocean environment."

The Bureau of Commercial Fisheries will be responsible for coordinating the oceanographic program. Participation is expected from Peru, Ecuador, Chile, and the Inter-American Tropical Tuna Commission. The Smithsonian Institution, the Environmental Science Services Administration (ESSA) of the Department of Commerce, Texas A & M College, Oregon State University and the U. S. Coast Guard are also expected to participate.

Wooster received his doctor of science degree from the University of California, San Diego. He is a member of several professional societies and serves on a number of national and international committees concerned with the marine sciences. He spent a year in Lima, Peru, as the first director of Peru's oceanographic and fishery research laboratory, which he organized. He was in Paris from 1961-1963 as Director, Office of Oceanography, United Nations Educational, Scientific and Cultural Organization (UNESCO), and Secretary of the Intergovernmental Oceanographic Commission.

NEWEST RESEARCH VESSEL "OCEANOGRAPHER" COMMISSIONED:

The oceanographic research vessel, *Oceanographer*, was commissioned on July 13, 1966, when it was turned over to the Coast and Geodetic Survey of the Environmental Science Services Administration (ESSA), U. S. Department of Commerce.

The *Oceanographer* is the largest, most modern, and most completely automated vessel built in the United States to probe the secrets of the deep sea. The \$9.2 million "floating laboratory" will bring to 14 the number of vessels operated by the Coast and Geodetic Survey.



The U.S. Coast & Geodetic Survey research vessel, *Oceanographer* (OSS01), is the most advanced oceanographic research ship of its kind built in the United States.

President Johnson spoke at the commissioning ceremonies which were held at the Washington, D. C., Navy Yard. The President called for a vigorous program of ocean research and said, "... the sea holds the ultimate answer to food for the exploding population of the world. Nearly four-fifths of all life on earth actually exists in salt water..." He added, "Our scientists are developing a process for turning whole fish into a tasteless but highly nutritious protein concentrate which can be used as a supplement to our daily diet. In addition, the United States Senate has recently passed a bill for the construction of several pilot plants to begin the commercial development of this fish protein food. The daily output of one of these plants would provide enough protein supplement for well over half a million people each day."

The vessel has a cruising range of 13,000 miles and can remain at sea for 150 days at a time. Its normal complement will be 13 officers, 39 crew and 45 technical and scientific personnel, with additional accommodations for 8 visiting scientists.

The *Oceanographer* will be followed later this year by a sister ship, now under construction in Jacksonville, Fla. The vessels are part of the national oceanographic program which received its impetus from the late President Kennedy who, shortly after taking office in 1961, asked Congress to authorize a new vessel with deep ocean capabilities.

The *Oceanographer* can operate equally well in any area of the global sea, including polar waters, and has over 4,100 square feet of laboratory space. All living quarters

and scientific areas are air-conditioned. Closed circuit television is provided throughout the engine room.

Note: See *Commercial Fisheries Review*, June 1966 p. 26.



Oregon

DUNGENESS CRAB CATCH, 1965/66 SEASON:

Commercial Dungeness crab landings for the 1965/66 season were well above the average for the past 20 years and the best since the 1960/61 season, the Oregon Fish Commission reported. From December 1965 through April 1966, Oregon landings of Dungeness crab totaled 8 million pounds, well above the 6.7 million pounds taken during the entire preceding season. It was estimated that the 1965/66 harvest would exceed 9.5 million pounds by the end of the season in mid-August. The 1960/61 landings were 11.3 million pounds, with average landings for the past 20 years between 7.5 and 8 million pounds.

Commercial crabbers indicated there were good numbers of legal size male crabs over the 6¼-inch commercial minimum width which provides optimism for the 1966/67 season.

The market for Oregon crabs was off early in the season, but with the cooperation of various state, Federal, industry, and consumer interests in publicizing this excellent seafood, the product made a strong and rapid comeback.

In recent years, the commercial fishery has taken about 90 percent of the legal size male crabs each season in a fishery that has grown in a spectacular manner under an usually lively market demand since the end of World War II.

The trend during the 1965/66 season is especially heartening since the crabs landed were predominately from the 1962/63 year class and were in the highly vulnerable larval stage during the summers of 1962 and 1963 when there was extensive seismic oil exploration activities off the Oregon coast. At that time concern was expressed by some that the use of explosives in the seismic work on the offshore grounds destroyed great quantities of crab larvae which would result

in drastically reduced crab populations in subsequent years. Part of the basis for the concern was that the landings fell from 6.9 million pounds in the 1961/62 season, immediately prior to extensive seismic work, to 4.5 million and 3.5 million pounds, respectively, in the immediately succeeding years when much of the oil exploration was conducted.

It appears now that the decline in landings merely reflected the normal variations in abundance of marine biological populations occasioned by changes in ocean environmental conditions. (Oregon Fish Commission, August 12, 1966.)

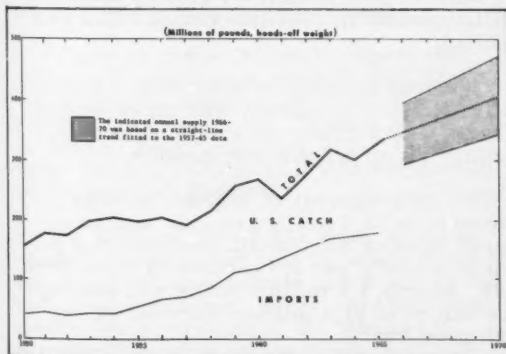
Note: See Commercial Fisheries Review, February 1966 p. 16.



Shrimp

GULF AND SOUTH ATLANTIC LANDINGS, 1965:

United States commercial shrimp landings (heads-off weight) in the Gulf and South Atlantic States during 1965 totaled 139.6 million pounds with an ex-vessel value of \$81.1 million--an increase of 12 percent in quantity and 17 percent in value compared with the previous year. Landings at ports of Texas, Louisiana, and on the west coast of Florida made up 80 percent of the 1965 total catch in the southern states.



U.S. shrimp supply, 1950-65 and indicated supply, 1966-70.

In 1965, Texas led all other states with total shrimp landings of 48.3 million pounds, followed by Louisiana with 39.8 million pounds, and the Florida West Coast with 23.6 million pounds.

Brown shrimp again was the leading species landed in Texas (34.3 million pounds), while white shrimp predominated in Louisiana (21.2 million white and 18.1 million pounds brown). Pink (21.5 million pounds) shrimp made up the bulk of Florida West Coast landings.

A breakdown, by major fishing areas, of the 1965 Gulf catch (excluding the Atlantic areas), shows 12.8 million pounds were taken from Sanibel and Tortugas; 3.4 million pounds from the Apalachicola area; 14.5 million pounds from Pensacola to the Mississippi River; 39.7 million pounds from the Mississippi River to Texas; 35.2 million pounds from the Texas coast; 5.0 million pounds from the high seas off the Mexican coast west of 94° W. longitude; 11.3 million pounds from the high seas off Obregon and Campeche; and 1.4 million pounds from the Caribbean Sea south of 21° N. latitude.

Note: See Commercial Fisheries Review, July 1966 p. 46.



Tuna

PACIFIC ALBACORE MIGRATED NORTHWARD EARLY:

Continued inshore warming of the ocean region off southern California caused tuna to remain well offshore this past summer and to migrate northward earlier than usual. The staff of the Tuna Forecasting Program, U. S. Bureau of Commercial Fisheries Tuna Resources Laboratory, La Jolla, Calif., had been observing the rapid offshore warmup and earlier had forecast an albacore fishery in the Pacific Northwest commencing in late July 1966. To test the laboratory's prediction, a technician was placed aboard the Bureau's research vessel David Starr Jordan to troll for albacore while on her regular anchovy-sardine surveys to determine whether or not the fish were moving northward. The first large concentration of fish was found at 35°22' N., 124°51' W. on the morning of July 14 (about 160 miles southwest of Monterey) in 61-62° F. water. Subsequently, the David Starr Jordan proceeded to take albacore in a broad band extending 120 miles southeast from 36°19' N., 125°26' W. to 35°07' N., 124°03' W. Earlier, the fishing vessel Sunrise, under charter to the Oregon Fish Commission on a preseason albacore survey, also reported taking 70 albacore along a line extending southward 30 miles

from 43°00' N., 127°00' W. (about 120 miles west of Cape Blanco) on July 8, 1966, in 59-60° F. water.

Thus, actual confirmation of early off-shore warming followed by northward-moving albacore was secured by the Tuna Resources Laboratory, in collaboration with the California Current Resources Laboratory and by Oregon Fish Commission biologists. It was believed that the Davidson Seamount region southwest of Monterey should produce commercial quantities of albacore by the third week of July, and commercial concentrations of albacore should appear off Eureka and about 100 miles west of Cape Blanco, Oreg., by the fourth week of July.

Note: See *Commercial Fisheries Review*, July 1966 p. 52.

* * * * *

AERIAL SURVEY OF WATERS BETWEEN CAPE COD AND CAPE HATTERAS:

Biologists of the Sandy Hook Marine Laboratory at Highlands, N. J., operated by the Interior Department's Bureau of Sport Fisheries and Wildlife, reported spotting 5 large schools of tuna between Cape Charles and Assateague Island, Va., on July 18, 1966, during their regular monthly aerial survey of sea surface temperatures and marine animals over the Atlantic shelf waters between Cape Cod and Cape Hatteras. The schools of tuna were located between 2 and 40 miles off the coast. The closest school to the shore was 2 miles due east of Little Inlet, Va.

Water temperatures over the shelf ranged from the low 70's off the Virginia-Maryland line to about 80° F. off Cape Hatteras. In addition to the tuna, the biologists observed an unusually high concentration of sea life in the surface waters over that area. There were several species of schooling fishes, giant manta rays, sunfish, sea turtles, and sharks. There were concentrations of hammerhead sharks 35 miles ENE of Cape Hatteras, and several schools of dolphin seen feeding on flying fish 130 miles ESE of Cape Henry, Va.

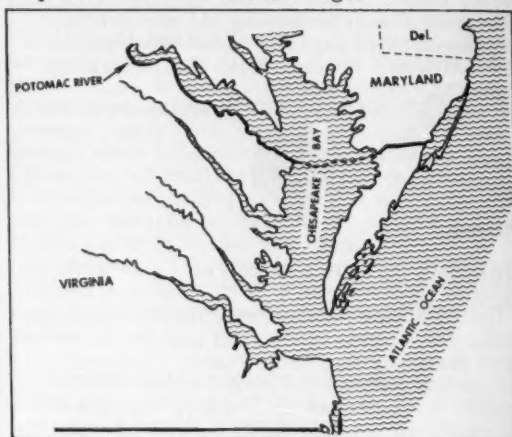


Virginia

FISHERY LANDINGS, 1965:

Commercial fishery landings in Virginia in 1965 totaled 503.7 million pounds with an

ex-vessel value of \$26.8 million as compared with 1964 landings of 465.8 million pounds worth \$24.2 million. A total of 121.0 million pounds was foodfish, and the remainder (383.0 million pounds) was used for canned pet food, bait, and for reduction. Heavy landings of menhaden accounted for most of the increase in quantity, while large harvests of oysters, blue crabs, and sea scallops contributed to the increase in value. Menhaden, blue crabs, alewives, and oysters accounted for almost 90 percent of the 1965 landings.



Virginia fishing areas.

Virginia's menhaden landings in 1965 totaled 350.9 million pounds with an ex-vessel value of \$5.2 million as against 330.2 million pounds in 1964 (ex-vessel value \$4.7 million).

Blue crab landings in 1965 totaled 51.6 million pounds in quantity with an ex-vessel value of \$4.2 million--down 1.8 percent in quantity but up 8.2 percent in value.

The 1965 harvest of market oysters amounted to 12.6 million pounds with an ex-vessel value of \$10.3 million--down 11.2 percent in quantity and 0.8 percent in value from 1964. Nearly 1.1 million bushels of seed oysters valued at \$1.4 million were harvested during the year.

In 1965, landings of sea scallop meats amounted to 2.8 million pounds valued at \$1.7 million; only 193,600 pounds were landed during 1964. Large beds of sea scallops were found off Cape Henry and scallop dredgers from as far away as Maine and Canada came to harvest the scallops.

The leading food finfish items landed in 1965 were alewives (36.2 million pounds), swellfish (10.5 million pounds), and sea bass (4.8 million pounds). Other finfish landings topping the million-pound mark were scup, butterfish, striped bass, fluke, croaker, spot, sea trout, and shad.



Washington

SALMON FINGERLINGS PLANTED ON YAKIMA INDIAN RESERVATION:

Some 50,000 fingerling spring chinook salmon were planted in the Klickitat River on the Yakima Indian Reservation by the Fish and Wildlife Service in cooperation with the Bureau of Indian Affairs, the Department of the Interior announced. The young salmon were raised by the Bureau of Sport Fisheries and Wildlife at the Willard National Fish Hatchery in Washington and were transported to the Klickitat River by truck.

The young fish were released about mid-August 1966 into the river at the McCormick Meadows area above Castile Falls on the slopes of Mount Adams in southwestern Washington in an effort to populate the upper reaches of the stream with natural-spawning adult fish. Fisheries biologists expect that the fingerlings, after journeying to the ocean, will return as mature fish in 2 or 3 years to the spot where they were released.

"There is every reason to expect that, with man's assistance, the Klickitat River will ultimately become one of the great producers of spring chinook salmon," said Dr. L. Edward Perry, director of the Columbia River Program Office of Interior's Bureau of Commercial Fisheries.

The Klickitat River has many miles of natural spawning and rearing areas suitable for spring chinook salmon and is one of the last great undammed, undiverted and unpolluted natural streams of the Northwest. Klickitat Hatchery, on the river, was constructed by the Federal Government and is operated by the Washington Department of Fisheries. It provides hatchery-raised coho (silver) and spring and fall chinook to augment the natural run of salmon in the river.

Under the Columbia River Fishery Development Program of Interior's Fish and Wild-

life Service, fishways have been constructed at the mouth of the river and at the Castile Falls in the headwaters to facilitate movement of fish into that watershed.

The planting of 50,000 fingerlings is aimed at increasing fish population in the upper reaches. It raises to about 250,000 the number of fingerlings planted in the Klickitat in 1966 by the Fish and Wildlife Service.

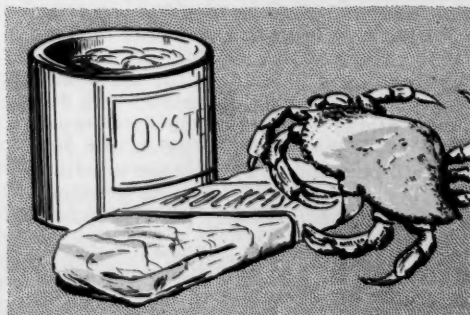


Wholesale Prices

EDIBLE FISH AND SHELLFISH, JULY 1966:

Because July 1966 prices for all fresh finfish were higher than the previous month, the wholesale price index for edible fishery products (fresh, frozen, and canned) at 129.7 percent of the 1957-59 average rose 2.0 percent. Compared with July 1965, the overall index this July was up 18.1 percent as a result of higher prices for nearly all items. July 1966 prices were sharply higher than a year earlier for most fresh and frozen fishery products and also for several canned fish products which were in short supply.

The subgroup index for drawn, dressed, or whole finfish was up 11.6 percent from June to July 1966 because of substantially higher prices for nearly all items. At Boston, prices for ex-vessel large haddock were sharply higher (up 51.5 percent) as a result of light supplies; Lake Superior fresh whitefish at Chicago by 17.8 percent; and Great Lakes round yellow pike at New York City by 14.7 percent. July wholesale prices were up at New York City for fresh king salmon (up 2.4 percent) and were slightly higher for western fresh and frozen halibut (up 1.1 percent). As compared with July 1965, the subgroup index this July was higher by 13.9 per-



Wholesale Average Prices and Indexes for Edible Fish and Shellfish, July 1966 with Comparisons								
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			July 1966	June 1966	July 1966	June 1966	May 1966	July 1965
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					129.7	127.2	126.9	109.8
Fresh & Frozen Fishery Products:					133.3	128.3	127.8	112.8
Drawn, Dressed, or Whole Finfish:					135.6	121.5	119.9	119.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.18	.12	143.6	94.8	101.5	91.4
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.49	.48	144.2	142.7	140.5	147.9
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.96	.94	134.5	131.3	120.9	125.8
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.63	.54	94.0	79.8	104.4	87.3
Yellow pike, L. Michigan & Huron, rnd., fresh.	New York	lb.	.70	.61	114.6	99.9	122.8	102.3
Processed Fresh (Fish & Shellfish):					130.1	132.4	134.8	108.6
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.45	.41	109.3	99.6	91.1	97.2
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.10	1.15	128.9	134.7	140.6	100.8
Oysters, shucked, standards	Norfolk	gal.	8.00	8.00	134.9	134.9	134.9	120.2
Processed, Frozen (Fish & Shellfish):					128.0	125.5	123.8	105.7
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.43	.43	109.0	109.0	109.0	97.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.39	115.8	114.3	112.9	108.5
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.33	.33	114.0	114.0	114.0	112.2
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.15	1.12	136.3	132.8	130.4	108.7
Canned Fishery Products:					128.8	125.6	125.6	104.9
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.50	28.50	124.2	124.2	124.2	95.9
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1 1/2 oz.), 48 cans/cs.	Los Angeles	cs.	13.20	13.69	117.2	121.5	121.5	102.6
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	8.00	135.6	135.6	135.6	120.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3 1/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	131.5	131.5

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Sources: U. S. Department of Labor, Bureau of Labor Statistics.

cent. Prices were generally higher for most items--sharply higher for fresh haddock (up 57.1 percent) and yellow pike (up 12.0 percent). July 1966 prices for whitefish were up 7.7 percent and for king salmon up 6.9 percent from the same month a year earlier but were lower by 2.5 percent for western halibut.

Although July 1966 prices for fresh haddock fillets at Boston rose 9.7 percent from the previous month, they were offset by a price drop at New York City for South Atlantic fresh shrimp (down 4.3 percent). This brought the fresh processed subgroup index down 1.7 percent from the previous month. July 1966 prices at Norfolk for shucked standard oysters were unchanged for the 3-month period since May but as compared with July 1965 were higher by 12.2 percent. Compared with July 1965, the subgroup index this July was up 19.8 percent. Prices were substantially higher for all items, but the greatest increase was for fresh shrimp (up 27.9 percent).

The July 1966 subgroup index for processed frozen fish and shellfish rose 2.0 percent from the previous month. Prices were

2.6 percent higher at Chicago for frozen shrimp and at Boston were up 1.3 percent for frozen haddock fillets; there were no changes for other items in the subgroup. This July the subgroup index was 21.1 percent higher than in the same month in 1965 because of higher prices for all items--substantially higher for frozen shrimp (up 31.4 percent) and flounder fillets (up 11.7 percent).

The wholesale price index for canned fishery products dropped 1.4 percent from June to July as a direct result of lower prices for canned tuna (down 3.5 percent). Prices for other canned fish items were unchanged. As compared with the same month a year earlier, the index this July was 18.0 percent higher. Prices were sharply higher for canned pink salmon (up 29.5 percent) because of the very light 1965 pack; prices for canned tuna were up 14.2 percent and jack mackerel up 12.2 percent. July prices for canned Maine sardines were steady and at the same level as in the previous month. (U. S. Department of the Interior, Bureau of Commercial Fisheries, Fishery Market News Service.)



FOREIGN

International

U.S.-U.S.S.R. TALKS ON FISHING OFF U.S. COASTS

FISHERY DISCUSSIONS CONCLUDED IN MOSCOW:

Fishery experts of the United States and the Soviet Union on July 30 concluded a week of technical discussions in Moscow on problems relating to the conservation and use of fishery resources off the U. S. coasts. The two delegations agreed to recommend to their respective Governments measures to alleviate the short-term problems and to establish procedures looking to long-term solutions.

Among the recommendations was a proposal that scientists and technical experts of the two countries meet in Moscow the week of November 13, 1966, to consider further the problems of conservation and of rules governing fishing vessels on the high seas, with respect to areas of both the Pacific and Atlantic off the U. S. coast. Following this meeting there would be a subsequent meeting of representatives of the two Governments to consider the conclusions of the scientists and technicians and to decide on further measures as might be indicated.

The delegations agreed to recommend that exchanges of fisheries personnel aboard fishing and research vessels of the two countries in both the Atlantic and Pacific areas be initiated within a month. It is expected that U.S. participants in the exchanges would include scientists, fishery management experts and representatives of the fishing industry.

It was also recommended that the Soviet Government take action to ease problems arising out of concentrations of vessels on fishing grounds customarily used by American fishermen, with immediate attention to the area off Oregon and Washington. A recommendation was also made that there be no Soviet fishing within 12 miles of the Washington-Oregon coast, except for research

vessels. The Soviet delegation agreed that special instructions would be issued to the Soviet fleet in this area reiterating earlier instructions not to fish for salmon.

The delegations also took note of problems which had arisen in the Shumagin Islands area of Alaska regarding conflicts between the fishermen of the two countries arising out of their use of different types of fishing gear. It was decided that these problems should be handled within the framework of an existing agreement between the two countries governing similar gear problems in the Kodiak area. (Department of State, August 3, 1966.)

CODEX ALIMENTARIUS COMMISSION

EXPERT COMMITTEE ON FISH AND FISHERY PRODUCTS TO HOLD FIRST MEETING:

The first meeting of the Codex Alimentarius Expert Committee on Fish and Fishery Products will be held in Bergen, Norway, August 29-September 2, 1966.

The Committee on Fish and Fishery Products was established under the Codex Alimentarius Commission following the Commission's meeting in Rome in October 1965, to coordinate and direct all work on the development of international fishery standards under the Joint FAO/WHO Codex Alimentarius Program. The Committee will be chaired by Dr. O. R. Brakkan of Norway.

The first meeting of the Expert Committee on Fish and Fishery Products will establish the guidelines and lay the groundwork for future developmental work on the international standardization of fishery products under the Codex Alimentarius Program. Included on the preliminary agenda for the meeting is a report on work on international standardization of fishery products done prior to the establishment of the Expert Committee last fall, and discussions on the drafting of standards for the following commodi-

International (Contd.):

ties: frozen fillet of Atlantic cod, haddock, and ocean perch; frozen whole Pacific salmon; salted herring; salted cod; canned Pacific salmon; canned sardines, sild, brisling, and herring; canned bonito in brine; and canned shrimp and prawns.

JAPAN-COMMUNIST CHINA
PRIVATE FISHERIES AGREEMENTMEETING PROPOSED IN OCTOBER 1966
TO DISCUSS IMPLEMENTATION:

The Japan-China (Communist) Fisheries Council proposed to the China Fisheries Association, headquartered in Peking, a meeting in Tokyo in October 1966 to exchange views between the two regarding implementation of the private Japan-China Fisheries Agreement and to continue proper management of the Agreement.

This is based on the intention of industry circles concerned which hope to promote mutual understanding between the organizations of the two countries, which are the parties to the private Fisheries Agreement, by maintaining mutual contracts not only at the time of negotiations for extension of the Agreement, but also during the validity period, so that the safe operations of Japanese fishing boats in the Yellow and East China Seas will not be jeopardized under the influence of cold relations between Japan and Communist China with the aggravation of the Vietnam war for a background.

The private Japan-China Fisheries Agreement was concluded between the two above-mentioned organizations to conserve the resources of fish (such as sea bream, lobsters, and yellow croaker) in the Yellow and East China Seas and to maintain the order of operations between the fishing vessels of the two countries, and the present Agreement, following the revision of the previous Agreement in December 1965, will remain in force until December 1967.

About 200 fishing vessels belonging to the Japanese "isei" (west of Long. 130° E.) drag-net fishery circles chiefly in Kyushu are engaged in fishing in the Yellow and East China Seas. During the validity period of the previous Agreement, the China Fisheries Association often pointed out violations of the Agreement by Japanese fishing vessels. Particularly, in the negotiations for the present

Agreement, the Communist Chinese side formulated a stiff policy that "any Japanese fishing vessels violating the 'Kato Line' (the no-entry line for Japanese fishing vessels under the Agreement) in the future will be subjected to due measures by the authority of the Chinese coast guard."

In view of such a situation, it is observed that there is much fear that if Japanese fishing vessels violate the Agreement, serious trouble will result. This is the reason that the Japan-China Fisheries Council proposed to the China Fisheries Association to hold an extraordinary meeting in order to deepen understanding on the part of the Communist Chinese regarding the condition of observance of the Agreement by Japanese fishing vessels and to prevent trouble between the two countries. (*Nihon Keizai*, July 19, 1966.)

Note: See *Commercial Fisheries Review*, June 1966 p. 74.

JAPAN-U.S.S.R. AGREE ON SCIENTIFIC AND
TECHNICAL COOPERATION IN FISHERIES

TEXT OF AGREEMENT:

This is the text of the U.S.S.R.-Japan agreement for Scientific and Technical Cooperation in Fisheries:

1. Objective: The objective shall be to promote the improvement of the fishing and the fishery products processing techniques of Japan and the U.S.S.R., the elevation of the fishing productivity in various sea areas, and the conservation, increase, and reasonable utilization of fishery resources, and thereby to conduce to the future development of fisheries of the two countries.
2. Items to be put into effect for cooperation in fishing: Japan and the U.S.S.R. shall, with the above objective, put into effect the following on the basis of the principle of reciprocity:
 - (a) Exchange of scientific and technical information and data concerning the following matters: (1) Marine products catching techniques and aquatic foodstuffs production techniques; (2) development of fisheries on the high seas and the elevation of fishing productivity in various sea areas; (3) management of fishing fleets; (4) increase and culture of fishes to be caught and their adaptation to environments; (5) investigation into fisheries.
 - (b) Inspection of commercial fisheries and aquatic foodstuffs production; and exchange of fishing experts for the inspection of scientific study activities in these fields.
 - (c) Joint investigation of fishery resources in which both sides take deep interest.
 - (d) Coordination of study activities for fishery resources to be conducted by the scientific and fishing organs of the both sides.
3. Ways to put into effect fishing cooperation: The various items of scientific and technical cooperation concerning fishery shall be put into effect in accordance with a plan to be worked out and agreed in every year by both sides.

It was reported that the Japanese intend to propose that during 1966 the technical cooperation under item 3 above should provide for:

International (Contd.):

(1) an exchange of research information on the trawl fisheries; and (2) a joint investigation into the saury resources including the techniques of processing and information on the effect of the fishery near Japan on the resource. (Fisheries Attache, United States Embassy, Tokyo, June 21 and 30, 1966.)

INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES

16TH ANNUAL MEETING:

The Plenary Sessions of the 1966 International Commission for the Northwest Atlantic Fisheries (ICNAF) annual meeting were held June 5-11, 1966, in Madrid, Spain. Delegates were present for all 13 ICNAF countries. The Plenary Sessions had been preceded by almost two weeks of preliminary scientific meetings wherein many items of substantive interest to ICNAF were discussed and reports prepared to guide the Commissioners in their deliberations. The data upon which the discussions and reports were based had been submitted by member countries in the interim since the last annual meeting. There were several items of special concern to the United States.

Topside Chafing Gear Problem: ICNAF has been unable to bring needed mesh regulations into effect. These regulations had been earlier agreed to by most ICNAF Contracting Governments, but had been accepted only with reservations by the United Kingdom, the U.S.S.R., and Poland. The reservations were that the regulations not apply to chafing gear used by stern trawlers. These countries, especially the U.S.S.R., use many stern trawlers in the ICNAF Convention area.

Just before the meeting the United Kingdom informed the United States of its desire to withdraw its reservations on topside chafing gear if the other Governments taking reservation did likewise. The Polish Delegation presented evidence to the Commission that it had developed a type of topside chafing gear which satisfied Commission conservation requirements. The Commission agreed that the Polish type of gear would be acceptable for use and the Polish stated that with this agreement they could withdraw their reservation on the previously proposed regulations. The Soviets agreed to equip their vessels with this gear but stated this would take "some time," after which they would be in a position to withdraw their reservation.

Soviet Capture of Haddock in ICNAF Sub-area 5: The Soviet catch of haddock in ICNAF Subarea 5 (Georges Bank, just off New England) rose from 5,483 metric tons in 1964 to 81,882 tons in 1965. This was more than the combined catch of haddock from Subarea 5 by both Canada and the United States. The Soviets acknowledged that they had begun a fishery for haddock in Subarea 5 during the latter part of 1965 (their prior catches were made incidental to the capture of other species) and claimed to be using regulation gear. They said they had collected no samples of commercially caught haddock in Subarea 5 in 1965, but would in 1966 and would report on this fishery to the next ICNAF annual meeting.

Regulation of Effort: The subject of regulation of fishing effort in the Convention Area was discussed at the ICNAF meeting. This discussion was not new to most ICNAF members, since most belong as well to the North East Atlantic Fisheries Commission (NEAFC). This question had been considered in depth at the 1966 NEAFC annual meeting held in May 1966. At the ICNAF and NEAFC meetings, the delegations agreed that it would be worthwhile to consider the topic of effort regulation, but no agreement was reached as to how this regulation should be brought about.

The subject of introducing economic criteria in determining effects of conservation regulations was discussed, and met with particularly divergent views. Nevertheless, it was agreed that the subject of introducing economic criteria into determining yields from the Convention area should be generally discussed, and a working party of biologists and economists was appointed to study the subject and report to the next ICNAF annual meeting. (U. S. Embassy, Madrid, June 16, 1966.)

Notes: (1) Member countries of ICNAF are the United States, United Kingdom, Canada, Denmark, France, Federal Republic of Germany, Iceland, Italy, Norway, Poland, Portugal, Spain, and the Soviet Union.

(2) See Commercial Fisheries Review, Aug. 1964 p. 49.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

SYMPOSIUM ON "THE LIVING RESOURCES OF THE AFRICAN ATLANTIC CONTINENTAL SHELF":

A symposium on "The Living Resources of the African Atlantic Continental Shelf, the stocks of such resources and their fisheries between the Strait of Gibraltar and Cape

International (Contd.):

Verde," will be held in Madrid, Spain, during the second half of June 1967, according to an announcement by the Secretary General of the International Council for the Exploration of the Sea (ICES). The exact date as well as the detailed program will be decided by the Council at its meeting in October 1966. Although the symposium will be held under the auspices of ICES, non-member countries, international organizations which may be interested, and persons or institutions interested will be welcome to take part by sending guests who may present papers and take part in discussions on an equal footing with participants from member countries.

A preliminary program has been set up by the Convener, Mr. R. Letaconnoux of France, based upon about 65 papers which have already been announced. An outline of the preliminary program, with the preliminary number of papers shown in parentheses, is as follows:

I. Faunistics

1. General (3)
2. Fishes (4)
3. Crustacea and molluscs (4)
4. Algae (2)

II. Biology and Ecology

1. Fishes in general (3)
 - Clupeides (2)
 - Scombirformes (6)
 - Sparidae (4)
 - Scianides, flatfishes, scorpenides and triglides (4)
 - Crustacea (1)
 - Cephalopodes (3)
2. Food (1)
3. Taggings (1)

III. Exploitation (7)IV. Production (11)V. Environment (hydrography, productivity etc.) (11)VI. Geology (1)

It is expected that also to be discussed will be the future collection of statistics from the area. Persons or institutions interested in presenting papers or otherwise participating in or attending the symposium, should

write to the Convener: Monsieur R. Letaconnoux, Chef du Service d'Océanographie et des Pêches Maritimes, 59 Avenue Raymond-Poincaré, Paris XVle, France. (Fisheries Attache, United States Embassy, Copenhagen, July 13, 1966.)

INTERNATIONAL WHALING COMMISSION

EIGHTEENTH ANNUAL MEETING:

The International Whaling Commission held its 18th annual meeting in London, June 27-July 1, 1966, preceded by 10 days of committee meetings.

Antarctic and Southern Hemisphere: The International Whaling Commission decided that the recommended pelagic catch limit for the 1966/67 Antarctic season should be reduced from 4,500 to 3,500 blue-whale units. It also confirmed the decision taken at the 17th meeting last year that the total catch for the 1967/68 season should be less than the "combined sustainable yields of the fin and sei whale stocks as determined on the basis of more precise scientific evidence."

In a further effort to preserve the world's whales, Commission member countries with land stations in the Southern Hemisphere agreed that a complete ban should be imposed on killing blue whales in the Southern Hemisphere instead of the present prohibition only in waters south of 40° S. latitude.

It was noted that Peru and Chile take whales from land stations, although they are not members of the International Whaling Commission. The cooperation of those countries will be requested.

North Pacific: The 5-year ban on killing blue whales in the North Pacific was reaffirmed and the humpback whale prohibition was extended through 1967. It was agreed that there was no need at present to recommend further regulations on killing sei or sperm whales in the North Pacific. It was agreed, also, that the North Pacific catch of fin whales should be brought below the estimated sustainable yield by 1969, but the Commission took no action on this proposal because the North Pacific member nations could not agree upon a method of reaching this objective.

Whale Quota Allocation, 1966/67: The allocation of the 3,500 Antarctic blue-whale units in 1966/67 among participating countries is outside the powers of the Commission.

International (Contd.):

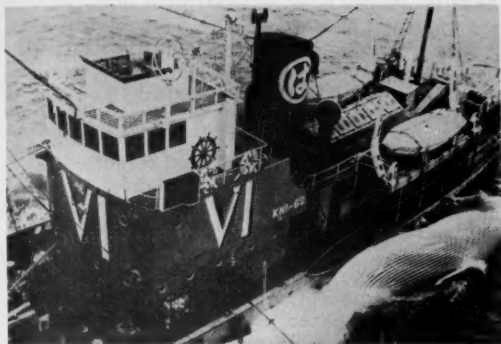


Fig. 1 - Japanese catcher boat towing a whale.

Quotas were discussed by Japan, Norway, the Soviet Union, and Great Britain, but no agreement was reached. The discussions were to be resumed in Tokyo.

Whale Catch and Oil Production, 1965/66: In the 1965/66 Antarctic season, 5 Japanese, 3 Soviet, and 2 Norwegian expeditions operated and caught a total of 1 blue, 2,318 fin, 1 humpback, and 17,583 sei whales amounting to a total of 4,091 blue-whale units. Those expeditions also caught 4,583 sperm whales in the Antarctic. In the previous season, 15 Antarctic expeditions caught the equivalent of 6,986 blue-whale units and 4,211 sperm whales.



Fig. 2 - Flensing a sperm whale aboard a Japanese whaling factoryship.

The total Antarctic production of the 1965/66 season was reported to be 678,708 barrels (a barrel equals one-sixth of a ton) of baleen and sperm oil; in 1964/65 production was 1,017,611 barrels.

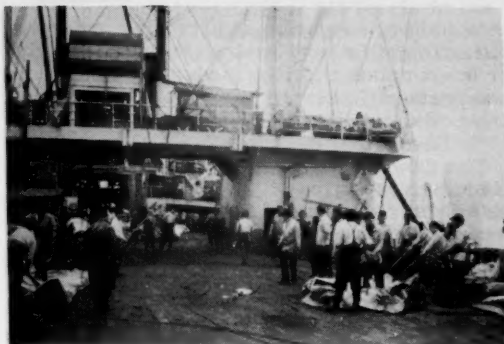


Fig. 3 - Cubing whale blubber strips on the foredeck of a Japanese whaling factoryship.

Outside the Antarctic, 26 land stations and seven factoryships operated in 1965 and took a total of 29,736 whales (593 blue, 4,506 fin, 452 humpback, 4,924 sei, 18,964 sperm, and 297 other species). On their way to and from the Antarctic, the pelagic expeditions caught 2,219 sperm whales to bring the total catch outside the Antarctic to 31,955 whales which yielded an oil production of 929,194 barrels. In 1964 the catch was 33,059 whales and the production was 887,722 barrels.



Fig. 4 - Soviet whale factoryship in western Gulf of Alaska.

W. C. Tame of Great Britain was elected Chairman of the International Whaling Commission for the next three years. The Vice-Chairman is Fujita of Japan. (*Fishing News*, London, July 8, 1966, and other sources.)

Note: See *Commercial Fisheries Review*, Sept. 1965 p. 53.

FOOD AND AGRICULTURE ORGANIZATION

COMMITTEE ON FISHERIES
HOLDS FIRST MEETING:

Improvement of international cooperation in fisheries was given top priority by the newly formed Food and Agriculture Organization (FAO) Committee on Fisheries, which held its first session in Rome from June 13-18, 1966.

Other priority problems identified by the Committee and noted for early consideration

International (Contd.):

were fishery education and training; effective utilization of fishery resources, particularly for human consumption; study of the economic aspects of fishery management; and marine pollution.

The Committee on Fisheries was established by resolution of the 13th Session of the FAO Conference in 1965 to advise the FAO Council on fisheries matters. Formation of this high-level Committee, together with the elevation of the former Fisheries Division to a Department, are designed to help FAO achieve the status of the leading intergovernmental body in the field of fisheries.

Fisheries administrators from all parts of the world attended the Committee's first session. Represented were 29 of the 30 member countries; 19 other countries and 6 international fishery organizations sent observers.



FAO Fisheries Committee Chairman Dr. A. W. H. Needler, right, confers with Dr. B. R. Sen, Director-General of FAO.

The Committee elected Dr. A. W. H. Needler of Canada as Chairman and Dr. J. Labarthe-Correa of Peru as First Vice-Chairman. Delegates elected as further Vice-Chairmen were: Mr. J. Rouge of France, Dr. K. Chidambaram of India, Mr. T. Kamenaga of Japan, and Dr. B. Kiop of Senegal.

Opening Statement: Opening the session, the Director-General Sen of FAO, referred to the "urgent human context" of the Committee's activities.

"You are meeting at a moment when the world is deeply preoccupied with questions of food supply," he said. "The next twenty or so years are likely to be especially critical. The present rapid growth of population will inevitably maintain its momentum, at least to the end of this century. Without a corresponding increase in food supplies, there must be several shortages that might well reach famine proportions. The most pressing need in many parts of the world is that for high-quality protein."

He continued: "The problems facing the world cannot be solved by FAO alone. Each and every interested member nation will need to think and act on its own in many of these matters and each member nation may also need to correlate more closely its policies towards the program of this Organization and those of other international agencies of which it may be a member."

Statement on International Fishery Problems: In an address to the Committee, given at the invitation of the Director-General, Director Cyril Lucas, Marine Laboratory, Department of Agriculture and Fisheries for Scotland, spoke about international fishery problems from the viewpoint of a scientist.

Lucas warned that scientists--and the catches--are revealing that even in several of the most successful of the fisheries developed in recent years, fishing has rapidly reached the level at which further effort on the stock in question will yield no greater, and perhaps even less, catch.

He said: "The very progress of science itself--from echo location to the prediction or discovery of new productive areas and far more productive sources--accelerates the rate of development and intensifies the problem. The answer is to make more sensible use of our discoveries. Undoubtedly, we are still very far from a rational exploitation of the sea. Somehow, through the actions of nations, regional bodies, and the worldwide authority of FAO, we have to find a surer way to manage the presently used resources to the best advantage, while searching with the aid of science for new ones--but new ones which shall, from the beginning, be studied and developed at a speed which will be rewarding and not defeating. This, I feel, is your biggest problem."

International (Contd.):

Subcommittee on the Development of Cooperation with International Organizations Concerned with Fisheries: In considering its role, the Fisheries Committee noted and supported the recommendation of the 13th session of the FAO Conference that the Committee should so conduct its work as to supplement rather than supplant other organizations working effectively in the field of fisheries. It decided to set up at once a Subcommittee on the Development of Cooperation with International Organizations concerned with Fisheries. The Subcommittee will (1) prepare a compendium of the various international fishery bodies concerned with research and conservation, (2) identify gaps and recommend appropriate measures to fill them, and (3) suggest steps likely to ensure better coordination and strengthen cooperation between the various international fisheries bodies and with FAO. Twelve nations comprise the Subcommittee: Brazil, Federal Republic of Germany, Ghana, Iceland, India, Japan, Pakistan, Peru, Poland, Romania, Spain, and the United States.

Regional Studies: Particular regions which the Fisheries Committee discussed and noted for more detailed study were the Indian Ocean and the Middle and South Atlantic. Further information will be collated for detailed consideration by the Committee at its next session.

Indian Ocean: In the case of the Indian Ocean, this task was given to a Working Party on the Rational Utilization of the Fishery Resources of the Indian Ocean. The Working Party will make recommendations to the Committee, as soon as possible, on such matters as: (1) the area and resources requiring attention and the information to be assembled to this effect; (2) the nature and scope of investigations to be carried out; (3) the kind of international body (existing or new) needed to carry out such investigations and to promote the rational utilization of the fishery resources; and (4) the relationship of the body with FAO. Members of the Working Party are Australia, Brazil, France, India, Iran, Japan, Kenya, Kuwait, Madagascar, Pakistan, the United Arab Republic, and the United States. The U.S.S.R., a nonmember of FAO, was represented by an observer at the meeting and will be invited to join the Indian Ocean Working Party, after the approval of the FAO Council is obtained.

Training: The need for comprehensive strengthening of training at all levels in the field of fisheries was uppermost in the minds of most representatives. The Committee felt that FAO should take the lead in this field and, as appropriate, enlist the cooperation of UNESCO and other interested agencies. At its next session, it will have the benefit of the discussion of the Symposium on Training which will take place at the 12th Session of the Indo-Pacific Fisheries Council in September-October 1966.

Resource Appraisal: Steps already taken to make a world appraisal of fishery resources were supported by the Committee. It agreed that FAO should lead in supporting this work, particularly in the exploration and assessment of stocks not yet fully exploited. Manipulation of the environment at the edge of the sea (aquaculture) may provide a rich source of food.

The importance of more effective utilization of fish resources was stressed by the Committee, which noted that 40 percent of the total world catch is being converted to fish meal for animal feeding. As one representative put it, the need is dire in many countries with grave protein shortages, and the stakes are therefore high.

Placed high on the priority list was the need for an intensive study of the economic aspects of management of fishery resources. Techniques for biological assessment of fish stocks are relatively well advanced (although far from universally applied) but the basic concepts or criteria for judging economic returns are still in a relatively early stage of development.

Pollution: Several delegations expressed concern over the possible effects of marine pollution. Little is known about the volumes of different sorts of wastes being discharged into the ocean, and national practices and legislation to regulate this. There may be an urgent need for international control measures and this will be discussed at the Committee's next session.

The Committee noted that the Director-General's Advisory Committee on Marine Resources Research (ACMRR) was collecting data about marine pollution and expressed the wish that this work proceed as rapidly as possible.

International (Contd.):

Fishery Statistics: Throughout the session, representatives referred to the need for adequate fishery statistics. They stressed that statistics are an essential prerequisite both for development of fisheries and for maintaining already developed fisheries at productive levels.

Closing Statement: Roy Jackson, FAO Assistant Director-General for Fisheries, had this to say about the meeting: "For a long time, many of us have felt the need for a world-wide Committee of this kind. After listening to the discussion at the first session, I am encouraged to believe that we now have a body with the membership, and competence, to deal effectively with many of the complex new international fishery problems with which we are faced. This Committee is unique in the fisheries field. Its membership represents more than two-thirds of the fishing power of the world in terms of total catch. No comparable body exists in the world today. The importance of its work cannot be overstressed."

The Committee will hold its second session in Rome in the second quarter of 1967.

**WORLD SYMPOSIUM ON
WARM-WATER POND FISH CULTURE:**

A World Symposium on Warm-Water Pond Fish Culture was held in Rome May 18-25, 1966, under the sponsorship of the Food and Agriculture Organization (FAO).

The meeting was attended by 120 experts from 39 nations and several international agencies.

While the marine fisherman must hunt the deeps much as he finds them, the inland fish culturist can control his fish stocks and the conditions in which they live. So scores of countries are working to develop their inland waters. "Growing fish in ponds goes back to prehistoric times," said Dr. H. S. Swingle of the United States after his election as Chairman of the Rome symposium, "but we still have much to learn if it is to help substantially in solving the problem of world hunger."

Summary: Among its recommendations, the symposium asked FAO to (1) intensify its fish-culture training programs, (2) prepare a

manual of fish-culture research methods, (3) and prepare a directory of fish-culture institutes.

The yield of fresh-water fisheries can often be greatly increased through intensive management techniques such as systematic breeding and specialized feeding. In the case of the Democratic Republic of the Congo, these methods have given yields of up to 9,000 pounds per pond acre. Such advanced technology has also been applied with success elsewhere, including the United States and the U.S.S.R. In some cases, the whole natural fish population has been removed from lakes which were then restocked with fewer species of larger, edible fish which feed at different layers, thus using all the food available.

In many Asian countries such as Mainland China, India, the Philippines, Indonesia, Malaysia, and Thailand, there is a long tradition of pond-fish culture. Yet this does not always mean that they are efficient producers, and several of these countries have received expert help from FAO in improving pond production. As the Rome symposium's chairman warned: "in many areas fish culture scarcely produces sufficiently to justify the use of water and land it utilizes."

In some Near East and Latin American countries, FAO experts have introduced pond-fish culture to areas where it had never been practiced. The Rome symposium offered an opportunity for some of these field workers who operate in isolation to examine their results in the context of world fish-culture developments.

Uganda Experiments with Tilapia and Carp: An FAO fish culturist whose headquarters is the Kajansi fish farm seven miles outside Uganda's capital of Kampala reported that he had cross-bred Uganda tilapia with Zanzibar tilapia and achieved 100 percent male offspring. The all-male stock was a stable population which could grow to the large size desired by consumers. Previously, since tilapia are such prolific breeders, the fish were stunted as ponds became overcrowded with fish competing for the available food. The FAO fish culturist in Uganda also increased carp production by developing improved breeding methods.

Experiments such as these are only the first step in increasing production. The next step is for local fish farmers to make full use

International (Contd.):

of experimental findings. Ponds must be enlarged and tended regularly. Fish farmers must also be convinced that they can draw a cash crop from ponds rather than produce fish only for their own consumption.

Regional Fish-Culture and Training Center in French-Speaking Africa: A recommendation with immediate relevance to Africa was the symposium's suggestion that agricultural departments and land and water authorities make allowances for fish culture in their development plans. This will be done on a large scale in French-speaking Africa when four Governments cooperate with FAO in a training program in fish culture to be launched in the latter part of 1966.

This regional fish-culture and training center will serve Cameroon, Gabon, the Central African Republic, and Congo (Brazzaville). It will be situated in the Central African Republic, will provide a three-year training course, and also conduct research into fish-culture problems which interest the whole region. Graduates will initiate training programs in their own countries.

Nigerian Brackish-Water Fish-Culture Study: The Rome symposium also recommended that fisheries organizations give greater attention to studies of brackish water fish culture in estuaries and coastal lagoons and swamps. One such study is being carried out by an FAO expert in Nigeria where the Government hopes to find a means

of using the 1 million acres of mangrove swamps along the coast.

Indonesia, with a similar mangrove swamp coastline, has evolved a "tambak" system which gives an abundant fish crop, and India also breeds fish in its coastal swamps.

An Indian fishery biologist is conducting the FAO Nigerian experiment on the island of Buguma, which lies 20 miles from Port Harcourt in the Eastern Region of Nigeria.

The Nigerian project faced formidable difficulties. The dwarf mangroves had to be cut and uprooted because they were draining off water. Moreover, mangroves cause a highly acid soil which is unsuitable for fish.

Despite these difficulties, and those of transporting materials through the swamp and of building within a tidal area, the experimental farm's 14 ponds were completed in March 1966. They are stocked with local fish and experiments are under way to determine which will give the greatest return and under what conditions. It should be possible to obtain 400-500 pounds of fish per acre from these ponds while, with more experience and intensive cultivation methods, production could be lifted nearer the Indonesian figure of 1,500 pounds per acre. These experimental ponds should make it possible for Nigeria to find a new source of protein and a viable industry in what before were merely mangrove swamps. (Food and Agriculture Organization, Rome, July 15, 1966.)

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FAO MEETINGS ON FISHERY MATTERS,
SEPTEMBER-DECEMBER 1966

Type of Meeting	Date	Location
ECE/Codex Alimentarius Group on Quick Frozen Foods	Sept. 5-9	Geneva, Switzerland
8th FAO Regional Conference for Asia and the Far East	Sept. 15-24	Seoul, Korea
2nd Meeting of the Codex Committee on Methods of Analysis and Sampling	Sept. 20-22	Berlin, Germany
Technical Conference of Fishery Officers of the Near East Region	September	Kuwait
2nd Meeting of the Codex Committee on General Principles	Oct. 3-7 (tent.)	Paris, France
5th FAO Regional Conference for Europe	Oct. 5-11	Seville, Spain
Symposium on Oceanography and Fisheries Resources of the Tropical Atlantic (Results of ICITA and GTS) (co-sponsored with UNESCO and STRC/OAU)	Oct. 17-22	Abidjan, Ivory Coast
47th Session of the FAO Council	Oct. 17-29	Rome, Italy
Conference on Fishery Administration and Services	Oct. 21-25	Rome, Italy
4th Session of the Joint FAO/WHO Codex Alimentarius Commission	Nov. 7-14	Rome, Italy
4th FAO Regional Conference for Africa	Nov. 9-19	Abidjan, Ivory Coast
9th FAO Regional Conference for Latin America	Dec. 5-17	Punta del Este, Uruguay
7th Session of Joint FAO/WHO Committee of Experts on Nutrition	Dec. 12-20	Rome, Italy
Working Party on Codes of Practice for Fish and Fishery Products	Dec. or early 1967	Rome, Italy

International (Contd.):

INTERNATIONAL LABOR ORGANIZATION

TWO CONVENTIONS ON CONDITIONS OF WORK IN FISHING INDUSTRY APPROVED AT INTERNATIONAL LABOR CONFERENCE:

The International Labor Organization (ILO), a United Nations specialized agency devoted to improving working conditions, held its annual International Labor Conference at Geneva, Switzerland, June 1-23, 1966. Delegates from over 100 member governments were present. One of the items on the Conference agenda was "Questions Concerning Fishermen." The Conference referred these matters to its Committee on Fishermen.

In considering these matters, the Committee had before it the texts of three proposed international instruments which resulted from the Preparatory Technical Conference on Fishermen's Questions held by the ILO at Geneva, October 18-28, 1965. The proposed instruments were: (1) a Recommendation Concerning Vocational Training of Fishermen; (2) a Convention on Fishermen's Certificates of Competency; and (3) a Convention on Accommodation on Board Fishing Vessels. A fourth item was added to the Committee's work when a Resolution concerning the Future Work of the International Labor Organization on Fishermen's Questions was referred to the Committee.

The Recommendation Concerning Vocational Training of Fishermen was adopted unanimously by the Committee. The Conference approved it by a vote of 330 for, none against with 6 abstentions. The United States delegates who were present voted yes. (The U.S. Worker delegate did not participate in Conference consideration of the "Questions Concerning Fishermen.") Planning and administration of fishermen's training programs, financing, training standards, qualifications of instructors, methods of training, and international cooperation are among the subjects covered by the Recommendation. It should aid in the recruitment of skilled personnel for fishing.

The proposed Convention on Fishermen's Certificates of Competency was also adopted by the Committee. The Conference approved the Convention by a vote of 284 for, none against, and 14 abstentions with the U. S. Government and Employer delegates abstaining from the vote on this matter. These U-

nited States delegates would have preferred to have this instrument in the form of a Recommendation rather than a Convention.

This Convention, when activated and subscribed to by various nations, will require, with certain minor exceptions, that all skippers on fishing vessels 25 gross registered tons and over, all mates on fishing vessels over 100 gross registered tons, and all chief engineers on fishing vessels with an engine power above a level to be determined by the competent authority in a nation, will be required to possess certificates of competency. (Sport fishing, whaling, and commercial fishing in freshwater areas are not covered by this instrument.) These certificates are to be issued after an applicant meets certain minimum experience requirements and has passed an examination which demonstrates his capability to perform the required duties. A "grandfather" provision would give blanket certification to all those in such occupations for a period of 3 years from the date of enactment of a nation's laws to implement the Convention.

The Committee also adopted the Convention on Accommodation on Board Fishing Vessels. This Convention would apply to all fishing vessels 75 gross tons or larger (except sport fishing vessels, whaling vessels, and vessels operating in freshwater). It applies to all new vessels and to major reconstruction of existing vessels and requires sleeping, mess, and sanitary facilities of a certain minimum standard. The Conference approved this Convention by a vote of 303 for, none against with 16 abstentions. The U. S. Government and Employer delegates abstained from the final Conference vote on this matter.

The two latter Conventions described above will now be opened for ratification. Many nations will probably sign and implement the Convention terms. In the United States, the U. S. Senate would have to consider and approve these documents before they could be implemented here. If the Senate should ever consider either or both Conventions, adequate opportunity for presentation of views by the public would be provided.

--By Walter H. Stolting
Division of Economics
U.S. Bureau of Commercial Fisheries

International (Contd.):

UNITED NATIONS DEVELOPMENT PROGRAM

UNDP/FAO CARIBBEAN FISHERIES DEVELOPMENT PROJECT:

This project is sponsored by the United Nations Development Program (UNDP), formerly the United Nations Special Fund (UNSF). The Food and Agriculture Organization (FAO) is the executing agency. The Special Fund is contributing about US\$1,800,000. The participating governments are supplying close to the equivalent of US\$800,000, and a like amount in kind through the provision of personnel, services, and facilities.

The participating countries in the project are French Guiana, Martinique, Guadeloupe and their dependencies (represented by France); Guayana; Surinam; Trinidad and Tobago; the Netherlands Antilles; Dominica; St. Vincent; Grenada; Jamaica; the Dominican Republic; St. Kitts; Montserrat; Antigua; St. Lucia; Puerto Rico (represented by the United States); and Barbados.

The project, which is described as a commercial feasibility project, consists essentially of three parts: (1) Exploratory and demonstration fishing; (2) marketing study and demonstration; and (3) training. In addition, during the course of the project, advice will be given to participating countries on sources of investment financing.

Under the general direction of FAO, the exploratory fishing part of the project is being organized and supervised by the U. S. Bureau of Commercial Fisheries under a contract with FAO. About two-thirds of the available funds for the project is earmarked for this activity.

Four deep-sea vessels are being supplied by the Development Program; 2 are about 82 feet in overall length and 2 about 56 feet overall length. Exploratory and demonstration fishing will be carried out in those waters considered to be potentially the most promising fishing grounds, namely the waters off the northeast coast of South America, the southern part of the Caribbean Sea and waters near the island chain from Grenada to Jamaica including offshore banks. Such biological and oceanographic observations as are considered practicable and desirable will be made by the exploratory fishing vessels.

There are 10 internationally recruited personnel directly associated with the exploratory fishing activity. The vessels will fly the flags of Trinidad, Jamaica, the Netherlands Antilles, and Barbados, and will have their home ports in those countries. In this context, home port means the port at which the vessels will be based and from which crews will be hired.

The marketing part of the project will emphasize the demonstration of improved methods of handling, storage, and distribution of fish and fishery products. Demonstrations will be made of the potential of various local species in export markets within and outside the area. Much of the success of this phase of the project will depend on counterpart personnel in the various participating countries, but from time to time expert advice will be solicited from short-term consultants to cope with specific problems identified by the Marketing Officer. Already, some of the participating countries have taken positive action to establish proper handling and storage facilities. Barbados, through its Marketing Corporation, has a substantial cold-storage depot, as has Jamaica. The Government of Trinidad and Tobago has a program for the establishment of a fishing port in Port-of-Spain together with the necessary supporting facilities on shore. Trinidad has been supplied with a marketing man for one year to start this program.

As for the training part of the project, this is possibly of the greatest interest to the participating countries. They recognize that lack of properly trained personnel is probably their greatest handicap. In cooperation with the Governments and the Ministries, the training of some 75 Master-fishermen and 30 Fishery Officers has been undertaken. Most of the training will be done on board the project vessels, but this is being supplemented by shore-based courses in Barbados, Jamaica, Curacao, and other participating countries.

The total number of people directly associated with the project is 181, of whom 14 are international and 167 local, including 105 trainees. In addition to the 14 international staff, provision is made for 50 man-months of consultants.

Through the cooperation of the Government of Barbados, headquarters for the project is located at Barbados. Office facilities

International (Contd.):

are being supplied by the Government and other facilities, such as docking space, cold storage, etc., are being supplied by the other participating countries as needed. Through the cooperation of the Jamaica Government a suboffice has been established at Kingston, where 2 Fishing Vessel and Gear Specialists and a Masterfisherman will be located.

It is interesting to note that the countries in the area covered by the project are big consumers of fish but over two-thirds of their fish consumption is imported largely in the form of dried salted, brined, and canned fishery products. These countries spend about US\$50,000,000 per year on the importation of fish products. Their own production is about 180,000,000 pounds annually. Although the need for processed products is recognized, a large demand for fresh and frozen fishery products remains unfilled. (United Nations Development Program, June 1966.)

EELS IN STRONG DEMAND IN EUROPE:

In 1965, during the 5 months or so that British eels were not available, live eels were flown from the United States to London in plastic bags surrounded by ice--30 pounds of eels to a carton. To satisfy the European demand, frozen eels have been flown in from as far away as Australia and New Zealand.

In Great Britain, good quality eels retail for about 7 shillings (98 U. S. cents) a pound, going down to about 5 shillings (70 U. S. cents) a pound in the summer season. (The Economist, April 9, 1966, and other sources.)

WORLD FISH MEAL PRODUCTION,
MARCH 1966:

World fish meal production in the first quarter of 1966 was up about 19 percent from the same period of 1965. Output was up sharply in Peru, Norway, and Chile.

Most of the principal countries producing fish meal submit data to the International Association of Fish Meal Manufacturers monthly (see table).

World Fish Meal Production, January-March 1966				
Country	March		Jan.-Mar.	
	1966	1965	1966	1965
..... (Metric Tons)				
Canada	4,953	7,154	18,918	21,828
Denmark	6,565	8,434	19,856	23,250
France	1,100	1,100	3,300	3,300
German Fed. Repub.	7,088	6,123	20,000	16,301
Netherlands	1/	524	1/	1,162
Spain	1/	2,758	1/	7,717
Sweden	342	1,001	768	2,658
United Kingdom	10,681	6,751	26,437	21,787
United States	4,359	2,861	8,349	7,260
Angola	3,805	2,654	13,484	15,257
Iceland	11,376	13,681	24,206	22,848
Norway	57,590	31,372	90,175	55,980
Peru	194,309	191,930	616,019	508,319
So. Afr. (including S.-W. Afr.)	32,595	43,091	54,276	74,547
Belgium	375	375	1,125	1,125
Chile	13,521	10,062	74,062	33,807
Morocco	1/	300	1/	300
Total	348,659	330,171	970,975	817,446

1/ Data not available.

Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present. Japanese production of fish meal in 1964 was reported as 423,700 metric tons by the Food and Agriculture Organization.



American Samoa

TUNA LANDINGS, JANUARY-APRIL 1966:

An article in the Japanese Fishery Newspaper Suisan Tsushin (June 24) gives the number of vessels and tuna landings at American Samoa, January through April 1966. Significant is the increase in the number of and the catch by vessels of South Korea and Taiwan. Japan expects eventually to be outfished by those two countries. (Fisheries Attache, United States Embassy, July 12, 1966.) Here are the landings as reported by the resident officer of the Japanese External Trade Organization (JETRO):

Landings of Tuna in American Samoa, January-April 1966					
	Jan.	Feb.	Mar.	Apr.	Total
Japan:					
No. of vessels	27	18	17	17	79
Landings (m. tons)	1,505	1,021	672	986	4,184
Korea:					
No. of vessels	13	11	17	15	56
Landings (m. tons)	903	495	940	956	3,294
Taiwan:					
No. of vessels	13	8	17	24	62
Landings (m. tons)	438	157	610	804	2,009
Palau:					
Landings (m. tons)	-	300	-	-	300
Total landings (m. tons) ..	2,846	1,973	2,222	2,746	9,787



Angola

FOREIGN INVESTMENTS IN FISHING INDUSTRY:

The director of the Angolan Department of Fisheries reported that progress has been made in encouraging Continental Portuguese and other foreign firms to invest in the Angolan fishing industry. He cited four examples:

1. A Continental Portuguese firm which intends to build a freezing and canning plant in Mocamedes, primarily for tuna.
2. A Spanish firm which expects to install freezing facilities to handle the catch from two trawlers based in Spain. The firm has indicated that it will organize a Portuguese company based in Mocamedes with over 50 percent of the capital registered in the name of Portuguese nationals. The company will build the freezing plant, the profits from the operation of which will enable the company to buy its own fleet of vessels. In return for this commitment the Government will authorize the Spanish firm to fish in Angolan territorial waters with its own vessels as long as all catches are sold to the Portuguese affiliate and until such time as the latter has enough vessels to satisfy the demand of the freezing plant.
3. A Portuguese fishing magnate plans to install a freezing and canning plant in Mocamedes which will be supplied by his own Continental Portuguese-based trawlers.
4. Another Continental Portuguese firm intends to fish with two trawlers in Angolan waters and to sell the catches to Angolan firms. The director of the firm, who is also president of the first firm above, stated that he planned to move his two firms to Angola. The company's two modern trawlers, with freezing compartments, are the Nautilus (which was launched in about December 1965 and operates from the port of Setubal) and the Nadir (which was launched in mid-April 1966 and has a capacity of 70 metric tons).

All of these projects are still pending Government approval, but since they comply with the December 1965 Government ruling that fishing companies based in Angola be over 50 percent Portuguese-owned, authorization will probably be forthcoming as long as the firms all show financial capacity to fulfill their commitments.

The Spanish proposal is a unique one, and is a technique that U.S. firms interested in investing in the fishing industry in Angola but discouraged by the December 1965 ruling might give serious consideration. The Spanish firm will have permission to fish with its own vessels in Angolan waters and keep the profits from sales to its shore-based affiliate until such time as the affiliate is able to buy its own fleet of vessels from the profits of the operation of the processing plant, which should take at least ten years.

In commenting on the investment proposals, the Regional Fisheries Attache stated that the current price for the small day-boat landings of tuna in Angola is only US\$50 a ton. This compares with \$300-350 in other parts of the world, and would seem to make investment in tuna canning attractive.

On the other hand, the price paid for landed fish used in meal varies from \$14-18 a ton, double that paid by South African fisheries. The Angolan fish meal plants, however, do not in most cases depend solely on meal for profit. Most firms combine their meal operations with the salting and drying of fish for export and internal consumption. In a given catch, the best fish are used for salted and dried, which draws a large margin of profit, while the remainder is used for meal. (United States Consulate, Luanda, May 19, 1966.)

GOVERNMENT FISHERY ACTIVITIES:

In June 1966, fishing interests in Angola established a firm which will provide insurance for industrialists and vessel owners in the commercial fishing industry. Capital for the firm, which was promoted by the Fisheries Institute of Angola, will be 750 contos (about US\$25,000) and will be subscribed in three equal parts by the Fishing Guilds of Benguela, Luanda, and Mocamedes. The industry hopes thereby to save about \$250,000 annually which has heretofore been paid to private insurance companies. This comprises the third important step within a month to modernize the Angolan fishing industry. The other two were the establishment of the Center for Technological Studies and Analyses in Luanda and the inauguration of the fishing laboratory and experimental vessel Goa in Lobito.

Angola (Contd.):

Fishing Institute Laboratory in Luanda: On May 20 the Center of Technological Studies and Analyses of the Fishing Institute was inaugurated in Luanda. The laboratory contains departments for chemical and physical analyses, and for biology and microbiology studies. According to the director of the Fishing Institute, the Center will perform the inspection functions handled heretofore by the laboratories of the Veterinary Research Institute, and in addition will engage in fish processing research. He observed, however, that until similar laboratories can be established in Benguela and Mocamedes, production there will continue to be inspected by the veterinary laboratories.

Delivery of the "Goa" Research Vessel: On May 28 the Goa, a fishery research vessel (constructed at the shipyards in Lobito and launched almost a year ago) was formally turned over to the Fishing Institute fully equipped and ready for operation. She is well equipped with the latest in electronic devices and refrigeration. Though owned by the Institute, it will operate under the supervision of a mission of the Center of Bio-Oceanology and Fishing, directed by a well-qualified Portuguese fishing technician who is currently in Peru observing methods adopted there. The Center is under the Board of Overseas Research (Junta de Investigações do Ultramar) of the Ministry of Overseas. (United States Consulate, Luanda, June 8 and 29, 1966.)



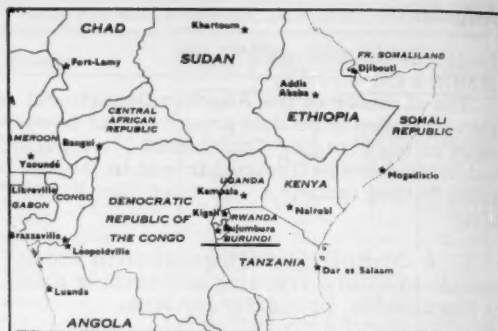
Burundi

FISHERY DEVELOPMENTS 1965:

In 1965 fishing was fair from April to October but better towards the end of the year. Overall production was better in tonnage than in 1964 as a result of a considerable increase in the number of fishermen.

The type of fishing in Burundi is divided into three classes:

Industrial fishing (done by the local Greek colony) is practiced by ten units (one more than in 1964). While the tonnage of larger fish has diminished, that of the smaller fish which are dried has greatly increased.



Artisanal fishing practiced by 180 catamarans (semi-professional Burundi fishermen) as against 127 in 1964. The tonnage caught by these were 1,921 metric tons as against 1,479 in 1964.

Ordinary fishing has developed considerably with 1,666 pirogues against 1,343 in the previous year. The tonnage of fish caught rose to 8,728 tons in 1965 from 5,478 tons in 1964.

In comparison with 1964, the tonnage of fish caught rose by 39 percent. In value the increase was even more spectacular than that (from about US\$270,000 to about \$920,000) because of devaluation and because of prices which advanced greatly during the year.

Demand for fish is continually increasing along the lakeshore (Lake Tanganyika) and even in the interior. Since no study has yet been made regarding the productive capacity of the lake, it is not yet known if it is worthwhile to increase the catch of fish on the 2,000 hectares (about 5,000 acres) of lake belonging to Burundi. Nevertheless, the responsible authorities of Burundi are trying to introduce the use of motors, and studies on the capacity of motorized pirogues have already been made. A study, approved by international organizations, foresees equipping 30 catamarans which will be divided among various fishing centers in order to increase the desire for this equipment among other fishermen. (United States Embassy, Bujumbura, July 5, 1966.)



Barbados

FISHERY LANDINGS AND TRENDS, 1965:

It is estimated that the total amount of fish landed in Barbados in 1965 was 5.7 million pounds, representing 1.1 million pounds more than the amount (4.6 million pounds) landed in 1964. Of this increase, only 200,000 pounds went through the public market, with some 900,000 pounds landed at beaches where there are no public markets. During 1965, some 2 million pounds of fish were landed at 4 main public markets on the Island, compared to 1.8 million pounds in 1964.

The Fisheries Department estimates that the percentage distribution of the total amount of fish landed in Barbados by species, on the average, is as follows: Flyingfish 58 percent; dolphin 16 percent; shark 7 percent; billfish 4 percent; kingfish and albacore 3 percent each; redfish 2 percent; and all other species 7 percent.

During 1965, some 1,982,000 pounds of shrimp were landed at the Barbados Marketing Corporation (B.M.C.), compared to 1.5 million pounds in 1964. Of the 1965 total, 1.62 million pounds were exported, mostly to the United States, the remainder being consumed locally. Shrimp brought to Barbados are exported by the Barbados Seafood Company, while the B.M.C. provides the necessary facilities for cleaning, packing, and storing.

A considerable increase in fish production is expected to result from the United Nations Regional Caribbean fisheries project and from the training of fishermen and the equipping of their vessels to permit them to go farther afield to exploit the offshore fisheries. It is proposed to organize production by the formation of a company comprising the government, existing local fishing interests including cooperatives, and expert overseas interests, with a view to carrying out deep-sea fishing operations on a large scale. This joint effort should reduce the need of individual owners for loan capital to finance their operations. These operations, up to now, have not been sufficiently remunerative to enable borrowers to repay their government loans, chiefly because of the relatively high cost of operating the smaller craft, the lack of adequate training to enable them to go farther afield, and until recently the absence of proper marketing facilities.

Cooperative fishing societies will be provided with facilities to assist them in servicing their vessels and will be encouraged to enter the marketing field in cooperation with the B.M.C. The Government will provide adequate staff to assist in vessel maintenance, improve docking and unloading facilities for the fishing craft, and to cooperate with the Bellairs Research Institute of McGill University in research and experimental projects designed to increase local knowledge of the habits and location of the fish in waters around the Island. A substantial expansion in shrimp production is expected as a result of the facilities, offered to the private sector. (Various sources, July 1966.)



Brazil

NEW DECREE ENCOURAGES FISHERY DEVELOPMENT:

Incentives for the development of the Brazilian fishery industry are contained in Government Decree No. 58,696, dated June 22, 1966 (the effective date). The incentives are designed primarily to encourage the producing segment of the fishing industry.

The main features of the Decree are: (1) Fishing vessels owned by Brazilian fishermen will no longer be required to pay port taxes, and (2) the fishing industry will be permitted to hire foreign fishing vessels for the limited period of one year, after which time a vessel hired in such manner must either become nationalized according to Brazilian regulations or abandon Brazilian territorial waters.

The Decree is a forerunner of a revised basic fishing law which is now in draft form and is being considered for passage by the Brazilian Government. The new law, when passed, is expected to bring even further changes favorable to fishing development. One proposal being considered, for example, is designed to attract more foreign capital into the fishing industry by raising the permissible ceiling of foreign ownership of Brazilian fishing companies from the present maximum of 40 percent to a new maximum of 50 percent.

Some of these changes in fishery policy being made or considered by the Brazilian Government are believed inspired by United

Brazil (Contd.):

Nations Food and Agriculture Organization technical experts in fisheries who are now working in Brazil assisting that country in fisheries development. (U.S. Embassy, Rio de Janeiro, July 8 and July 21, 1966.)

Note: Copies of a translated version of the Decree are available free from: Branch of Foreign Fisheries, Bureau of Commercial Fisheries, U.S. Department of the Interior (Room 8015), Washington, D. C. 20240.

**Canada****EXPERIMENTS WITH LOBSTER FISHING CONTROLS IN NORTHUMBERLAND STRAIT:**

Canadian lobster fishing in District 8--where the lobster season will be open from August 10 to October 10--has been selected for an experiment in trap limitation and vessel control regulations. The district comprises that part of Northumberland Strait which touches the shores of Prince County in Prince Edward Island, Kent and Westmoreland Counties in New Brunswick, and part of Cumberland County in Nova Scotia.

Lobster fishermen in that district will be limited to setting 250 traps per boat during the 1966 season. Before fishing licenses are issued for the district, boat owners must have their boats either licensed or registered.

When fishing licenses are issued, the Federal Department of Fisheries will provide fishermen with special numbered tags which are to be attached to each lobster trap. It will be the responsibility of the fisherman to place the tags on his traps.

The Canadian Fisheries Minister stated that these requirements are being introduced as an experiment designed for protection of lobster stocks and to ensure better returns to fishermen. Results achieved in this district will determine Canadian future policy in this regard. (Canadian Department of Fisheries, Ottawa, May 16, 1966.)

YELLOW PERCH PRICE SUPPORT PROGRAM FOR FISHERMEN IN LAKE ERIE AREA:

A program to stabilize prices to Canadian fishermen engaged in the yellow perch fishery of Lake Erie was announced July 13,

1966, by the Canadian Federal Minister of Fisheries. It is proposed that the support program will be operative in time for the heavy fall fishery. Officials of the Canadian Fisheries Price Support Board will work out the details of the program with a small Advisory Committee representing both fishermen and processors, the Minister said.

Because of wide fluctuations in production from month to month and from year to year, prices to fishermen have varied from a high of 25 cents a pound to a low of 3 cents a pound over the past 5 years. Such fluctuations make it extremely difficult for both fishermen and processors to plan their operations and merchandising programs. Annual production of yellow perch ranges from 10 to 20 million pounds a year.

The major Canadian yellow perch catch comes from Lake Erie and measures to stabilize prices in that area will undoubtedly result in stable prices in other producing areas. Most of the production is marketed in the United States in filleted form, although there is a growing market in Canada for fillets and breaded and cooked products. (Canadian Department of Fisheries, Ottawa, July 13, 1966.)

NEW FRESH-WATER FISHERIES RESEARCH INSTITUTE ESTABLISHED AT WINNIPEG:

The Fisheries Research Board of Canada is establishing a multidiscipline fresh-water research institute on the campus of the University of Manitoba at Winnipeg.

This institute will be concerned with basic research into the mechanisms and processes of biological production in fresh waters, and studies fundamental to the development of improved means of storage and marketing of fresh-water fishery products. Total staff will expand over the next few years to approximately 150. (Fisheries Research Board of Canada, May 1966.)

**Chile****FISH MEAL AND OIL TRENDS, MAY 1966:**

Anchovy fishing during May was unexpectedly good, reaching a total of 145,334 metric tons, compared to the 22,064 tons in 1965 and 90,571 tons in 1964. This year through May a total of 654,985 tons of anchovy was taken.

Chile (Contd.):

In Arica, during May, a total of 7 factories were operating; in Iquique 20; and 1 in Tocopilla. In the North Zone, 28 plants out of 33 operated an average of 16 work days each.

The production of fish as meal compared to the previous years was:

Year	May	Jan.-May
	(Metric Tons)	
1966.....	26,653	114,864
1965.....	4,090	41,961
1964.....	16,233	85,079

Fish oil production during May was relatively high reaching 4,097 tons and a total production of 11,234 tons to date.

The average yield for fish meal during May was 18.2 percent (January 17.2 percent, February 17.2 percent, March 17.9 percent, and April 17.5 percent) and 2.8 percent for oil.

Fish meal production from other species (hake, sardines, etc.) from the Norte Chico and Central Zone reached a relatively high level of 14,056 tons through May. Fish meal production from those species in 1965 was 12,043 tons and in 1964 was 6,374 tons.

Export prices for fish meal in Chile and Peru, quotation for cost and freight per metric ton in Antwerp/Hamburg market follows: May - US\$160/165; June - \$168; and July/December - \$170. (U.S. Embassy, Santiago, June 27, 1966.)



Cuba

FISHERMEN TRAINING BY SOVIETS:

In mid-May 1966, a group of 65 Soviet technical experts and instructors arrived at Havana, Cuba, led by a Soviet fishing captain. The group will replace 65 Soviet instructors who have been giving practical instruction for the past six months in fishing techniques to Cuban fishery apprentices. The U.S.S.R. is maintaining a strong liaison group with the Cuban Institute of Fisheries, helping the Cubans in fishery research, fishing techniques, technology, the training of fishermen, construction of fishing vessels, and the general organization of the state-owned Cuban fishing industry. The general frame for this work was established by the signing in Ha-

vana by Soviet Fisheries Minister A. A. Ishkov of the 1962 Agreement for Technical Aid to Cuba. Pinched by falling sugar production and failures in agriculture, the Cubans--like the Soviet Union--are turning to fisheries as a major source of animal protein as well as a prime source for obtaining hard foreign currency.



Dahomey

FISHERY DEVELOPMENTS, 1965:

One more trawler was added to the fleet operating out of the port of Cotonou to raise the total to six for 1965. Their total catch was estimated at 1,500 metric tons, which compares very favorably with the 946 tons for 1964. As commercial production rose, artisanal production declined so that for 1965 only 3,000 tons were caught as against 6,000 tons for 1964. The catch from the lagoons and the rivers remained constant at 15,000 tons. To supplant the local supply, the importation of fish was authorized. According to the Customs Service, 1,910 tons were imported, mostly frozen from Japan and the Soviet Union. (Editor's Note: This was primarily from Japanese and Soviet vessels fishing in the eastern Atlantic off the west African coast.) (American Embassy, Cotonou, July 26, 1966.)



Ecuador

SHRIMP AND TUNA FISHERIES, 1965:

Shrimp is by far the most valuable aquatic species taken by Ecuadorian fishermen. Preliminary data indicate that in 1965 the shrimp catch totaled 7,300 metric tons valued at US\$3,612,000. The 1964 catch of shrimp was 6,500 metric tons valued at \$2,756,000. In 1965, about 2,600 tons of frozen shrimp were exported, all to the United States.

The white shrimp and the "titi" are the most heavily fished by the Ecuadorean fleet. The pink shrimp, found at greater depths, cannot be caught by the majority of the Ecuadorean vessels, which cannot employ fishing gear at depths below 40 meters (130 feet). The pink shrimp has also proved to be somewhat elusive. No dependable commercial concentrations have been found to date and

Ecuador (Contd.):

little is known of their distribution. The National Fisheries Institute has discovered what appear to be abundant concentrations of a large bright red shrimp similar to the Gulf of Mexico royal-red shrimp, but the shrimp are located some 500 meters (1,640 feet) deep, well beyond the fishing depth capacity of any Ecuadorean shrimp vessel. Development of new shrimp resources is necessary to expand the shrimp industry as the present populations of the white and titi shrimp are being fished to capacity.

Preliminary estimates place the tuna catch in 1965 at about 20,100 metric tons, valued at US\$2,734,000. The tuna catch has averaged about 21,000 metric tons annually since 1961. Similar to shrimp, most of the tuna exported is destined for the United States market; the amount of frozen whole tuna purchased by the United States in 1965 was 5,000 tons.

About 95 percent of the Ecuadorean tuna catch consists of bonito, caught with poles, bait, and barbless hooks in one-day operations. There are only 4 purse seiners in the Ecuadorean fleet. Any major increase in the tuna catch will require more modern vessels with refrigeration facilities. Presently, tuna vessels leave Manta daily and do not go beyond 6 hours from port. The majority of the tuna catch is taken from April through July when the bonito migrate near to the Ecuadorean coast.

In early 1966, various firms announced intentions that will result in further investment in the tuna and shrimp fisheries of Ecuador. One subsidiary of a United States firm, not yet established, will install a tuna-freezing plant in Manta and will ship all of its tuna to a canning plant in Puerto Rico for processing. Another subsidiary United States firm, already established and canning about half of its tuna production in Ecuador, is planning expansion. A local shrimp packing firm was also entering an expansion phase. (U.S. Embassy, Quito, May 27, 1966, and U. S. Embassy, Guayaquil, July 10, 1966.)



French Guiana

SHRIMP INDUSTRY TRENDS:

The total shrimp catch of two shrimp companies operating in French Guiana with

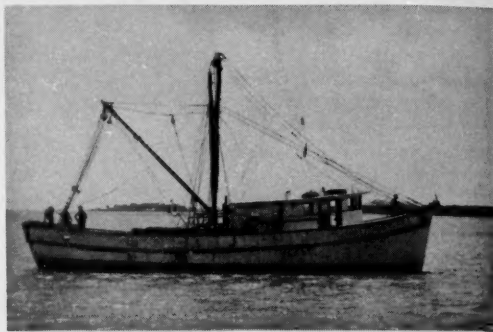


Fig. 1 - Typical Florida shrimp trawler fishing for one of the two U.S.-controlled shrimp companies in French Guiana.

U.S. capital and management increased to about 1,600 metric tons in 1965, valued at about US\$3.2 million. Production in 1964 was 1,369 tons. One firm accounted for about 1,200 tons and appears to have solved the management problems that plagued it initially. This firm operated 29 U. S.-registered trawlers last year and employed 150 full-time workers, including trawler captains. The fleet will expand to 39 vessels in 1966, some of which were already in operation in May 1966. The purchase of 10 additional trawlers is planned for 1967.



Fig. 2 - Shore facilities of one of the two shrimp companies in French Guiana operating with U.S. capital and management. At left, packing and freezing plant, offices; at right, ice plant.



Fig. 3 - Dock as seen from the plant in figure 2. Machine shop for fleet at right. Icing and unloading facilities at left.

The second firm, now reorganized, produced only 400 metric tons of shrimp last year. Although the land-based facilities are capable of processing the shrimp catch of 50 vessels, in the reorganization its fleet of 30 trawlers was reduced to 12.

French Guiana (Contd.):

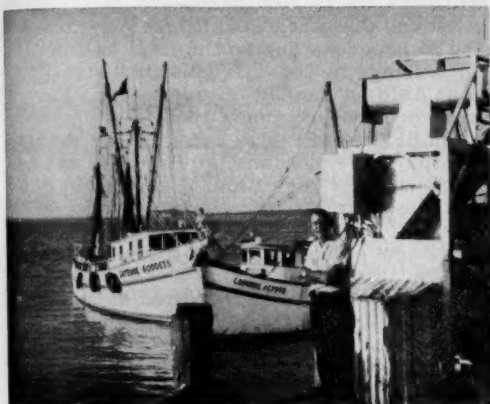


Fig. 4 - Steel and wooden trawlers at the ice loader located on the deck pictured in figure 3.



Fig. 5 - For its shrimp plant, one of the two firms mentioned in the article had to build a complete village, plant, machine shop, ice plant, net loft, grocery store, restaurant and bar, and houses. These houses are for plant officials and vessel captains.



Fig. 6 - Sea bobs are caught in the Cayenne River in Chinese shrimp nets. Raft is a net tender. Trap stakes can be seen in left background.

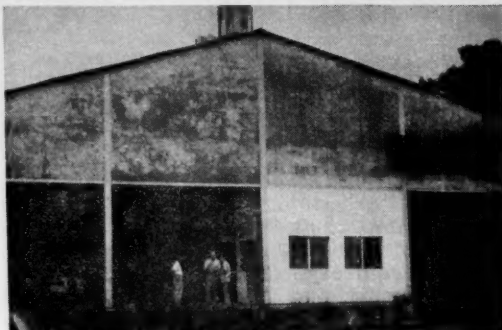


Fig. 7 - Shrimp and fish freezing plant of a government-sponsored cooperative at Cayenne, French Guayane. It freezes sea bobs heads on for export to France.

A French company, which had begun to export the shrimp catch of 3 trawlers to France in 1965, went bankrupt in November 1965, leaving only 2 firms operating in French Guiana. (U. S. Consul, Martinique, May 27, 1966.)



Ghana

FISHERIES AID FROM SPAIN AND NORWAY:

After the coup of February 24, 1966, the new Government of Ghana ordered the departure of a number of Soviet technicians, among them fishery experts, who were in Ghana under various Soviet assistance programs. Since that time Ghana has sought help from other countries.

A three-member mission representing the Norwegian Agency for International Development arrived in Accra on June 7. The chairman of the mission said that the purpose of the visit was to discuss technical assistance to the Ghanaian fishing industry. A group of 11 Norwegian fishing experts arrived in Accra in late June to fill an 18-month contract with the state-owned Ghana Fishing Corporation. The fishing technicians will help to man the Fishing Corporation's vessels, some of which have been idle as a result of the departure of Soviet crews shortly after the coup of February 24.

Twelve Spanish fishing technicians are expected to arrive in Ghana during July to look into the possibility of Spanish assistance in operating fishing vessels formerly manned by Soviet crews. The vessels have been an-

Ghana (Contd.):

chored at Tema since these crews were repatriated following the coup. The additional Spanish technicians will join an advance party of 12 other fishing experts from Spain already in Tema under a contract with the Ghana Government. (United States Embassy, Accra, June 9 and July 9, 1966.)



Guinea

SOVIET FISHERY AID:

The first 4 of 10 fishing vessels under a Soviet-Guinean agreement on Technical Cooperation for the Development of the Guinean Marine Fisheries were delivered in May 1966. At the acceptance ceremonies in the port of Conakry, the Soviet Ambassador Voronin stated that the vessels are now part of the Guinean fishing fleet. The Minister of Agriculture of Guinea in reply stressed the Soviet aid to Guinea. The vessels, reportedly seiners, will carry Soviet crews who will train replacements from among Guinean apprentices. (Tass International, May 19 & 21, 1966.)



Iceland

HYDRAULIC REEL FOR
LINE FISHING DEVELOPED:

An Icelandic inventor has developed a long-line hydraulic reel called Linomat (trade-mark). He wishes to arrange production rights with a United States firm for markets other than Europe.

The inventor describes Linomat as follows: Weight 45 pounds, size $9\frac{1}{2} \times 12\frac{1}{2}$ inches. The reel mounts on a vessel railing and is driven by sea water which is pumped through a pipe installed along the gunwale. Several reels can be installed side by side and each is connected to the pipe by use of $\frac{1}{2}$ -inch rubber hose. Reels can easily be removed from rail mounts. The reel works semi-automatically and is controlled by one lever. Feeding mechanism insures even winding of the line on the reel. (U.S. Embassy, Reykjavik, June 16, 1966.)

Note: For additional information write to Jon Thordarson, Skipholt 51, Reykjavik, Iceland.



Ivory Coast

FISHERIES, JAN.-JUNE 1966:

Although the Ivory Coast fisheries continued to progress during the first half of 1966, landings by the 70-vessel industrial fleet at Abidjan leveled off somewhat. For the period July-December 1965, landings totaled 22,615 metric tons, bringing the year's production to 44,599 tons, an increase of 14.6 percent over the year 1964. Landings by this fleet for the first six months of 1966 have been 20,241 tons, or some 8 percent less than for the same period of 1965. It seems likely, therefore, that this year will see about the same commercial fish production as in 1965.

Construction of the second quay, of 430 meters in length (for which EEC financing has already been assured), should begin by the end of 1966 at the new fishing port in Abidjan. Plans and specifications for the new 3,000-ton storage capacity fish-freezing plant, long delayed for various reasons, are under study by an American consulting engineer. The U. S. Agency for International Development has received a request from the Ivory Coast Government for a feasibility study for a proposed "tuna complex," involving a fleet of Abidjan-based tuna clippers, a tuna cannery, a byproducts operation, and a can-making plant. If feasibility is established, the project could result in a substantial opportunity for U. S. machinery and equipment such as fishing vessels, nets, fishing equipment, canning machinery, processing machinery, and other supplies. (Fisheries Attache, United States Embassy, Abidjan, July 12, 1966.)



Japan

FROZEN TUNA EXPORT
PRICE TRENDS, APRIL 1966:

Japanese trade sources reported that frozen round albacore contracted for export sale to the United States in April 1966 averaged \$480 a short ton f.o.b. as compared to \$380 a ton in April 1965. Yellowfin tuna (gilled-and-gutted) were sold at an average price of \$487 a short ton f.o.b. as compared to \$310 a ton a year earlier.

Beginning in mid-April, export sales had fallen off sharply and Japanese industry circles interpreted the slow-down in buying activity by American buyers as due in part to

Japan (Contd.):

the excellent catches of tuna by the U. S. tuna fleet. (Suisan Keizai Shimbun, May 27, 1966.)

FROZEN TUNA EXPORTS TO U. S. AND PUERTO RICO, MARCH-APRIL 1966:

Japan's exports of frozen tuna to the United States and Puerto Rico for April 1966 totaled 11,197 short tons valued at US\$5,171,395. This was a decrease of 3,522 tons from the four-months high total of 14,717 tons reached in March 1966. (Fisheries Attache, United States Embassy, Tokyo, June 24, 1966.)

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, March and April 1966				
Species	April		March	
	Qty.	Value	Qty.	Value
	Short Tons	US\$ 1,000	Short Tons	US\$ 1,000
Albacore:				
United States . .	2,126	1,028	2,405	1,150
Puerto Rico . . .	1,475	746	3,382	1,620
Total	3,601	1,774	5,787	2,770
Yellowfin:				
United States . .	2,794	1,460	3,702	1,846
Puerto Rico . . .	1,999	1,008	1,658	726
Total	4,793	2,468	5,360	2,572
Big-eyed:				
United States . .	125	45	139	22
Puerto Rico . . .	323	110	207	70
Total	448	155	346	92
Skipjack:				
United States . .	1,894	836	2,941	1,010
Puerto Rico . . .	461	136	283	58
Total	2,355	772	3,224	1,068
Total United States	6,939	3,169	9,187	4,028
Total Puerto Rico	4,258	2,000	5,530	2,474
Grand Total . .	11,197	5,169	14,717	6,502

CANNED TUNA IN BRINE SALES SLOW:

Japanese canned tuna in brine exports to the United States as of early June 1966 were reported to be light due reportedly to the slow United States canned tuna market. No sales have been contracted since April 1966 when 43,000 cases were sold to exporters by the Canned Tuna Sales Company. The exporters have asked packers to reduce their prices to the level where Japanese canned tuna could compete with United States products. It was reported that they were seeking a reduction in price of US\$1.30 a case for

whitemeat tuna and \$1.10 a case for lightmeat tuna.

The packers claim they cannot lower prices since they are paying around 180 yen a kilogram (\$454 a short ton) for the raw material and would lose money even if they sold their packs at prevailing prices. Some packers believe there is a current worldwide shortage of albacore so there is no need to rush sales at this time. Exporters are claiming that, unless the packers reduce their prices, they may have to purchase canned tuna in the United States in order to supply their outlets during the summer season. (Kanzume Nippo, June 9, 10, 16, 1966.)

NEW QUOTA FOR SALES OF CANNED TUNA TO U. S.:

A new quota for sales of canned tuna in brine to the United States was established in late June 1966. The quantity is 100,000 cases with no change in price. Agreement could not be reached in May because of the high cost of tuna and because of the lack of new officers authorized to act for the Joint Sales Company. (Fisheries Attache, United States Embassy, Tokyo, July 13, 1966.)

ATLANTIC TUNA FISHING AND EXPORT MARKET TRENDS:

Albacore fishing in the Atlantic Ocean off Angola and further south to the waters off South Africa was reported good towards mid-June, with vessels averaging catches of 4-5 metric tons a day. The price of frozen round Atlantic albacore for export to Puerto Rico was quoted at US\$435 a short ton f.o.b. Tema, Ghana. This was a decline of about \$80 a ton from the peak reached in March 1966. The Italian tuna market was reported to have softened slightly, with yellowfin, d.w.t. (dressed without tail), quoted at \$610 a metric ton c.i.f. Yellowfin fishing in the Atlantic continued poor. As a result, more Japanese exporters were beginning to ship yellowfin to Italy directly from Japan proper. (Suisan Tsushin, June 17, 1966.)

THREE PURSE-SEINE FLEETS TO OPERATE IN ATLANTIC:

Beginning in June 1966, Japan planned to operate three purse-seine fleets in the east-

Japan (Contd.):

ern Atlantic Ocean. They include the fleets led by the motherships Chichibu Maru No. 2, Hakuryu Maru, and Seisho Maru. Each fleet is accompanied by a number of support craft. The Hakuryu and Seisho Maru fleets were operating in the Atlantic fishery for the first time this summer under contract to the fishing company which operates the Chichibu Maru. The fleets were operating out of Freetown, Sierra Leone, and Tema, Ghana, and fishing mainly for skipjack. To service the three fleets, a large Japanese net manufacturing firm planned to open field offices in Freetown and Tema. (Suisancho Nippo, June 20, 1966.)

LONG-LINERS MOVING FROM INDIAN OCEAN:

Japanese long-line fishing vessels "moved on" from the Indian Ocean. It was reported they discovered that long-line tuna fishing off the eastern seaboard of Southern Africa, and more particularly the fishing banks to the south of Madagascar, was no longer an economic proposition.

The fishing fleets have, it is believed, moved to the Atlantic Ocean, operating off Adidjan on the Ivory Coast. Apart from fish being plentiful there, they are found closer inshore than off the eastern seaboard of South Africa.

This factor eliminates the long hauls which had to be made from the fishing grounds to Durban where the catches were discharged and stored in cold storage. It is known that this space, which was booked on contract, was cancelled from the end of April.

For nearly three years the Japanese fishing fleets operated with considerable success to the south of Madagascar and were familiar sights in port, landing their catches and taking on supplies and huge quantities of fresh bait. As of early May 1966, there were only isolated Japanese fishing craft calling, mostly en route for supplies and fuel. The presence of up to half a dozen vessels in port at a time has become a thing of the past. (South African Shipping News and Fishing Industry Review, May 1966.)

POLE-AND-LINE TUNA LANDINGS, MAY 1966:

A total of 2,698 metric tons of albacore was landed in May at Yaizu (Japan's principal tuna port) by the pole-and-line fleet. Of that quantity, 1,942 tons (76 percent) were landed during the last 10 days of the month. The albacore were sold ex-vessel at prices ranging from 140-198 yen per kilogram (US\$353-499 a short ton) in late May, according to data compiled by the Fisheries Agency and published in the Agency's "Fishing Condition Rapid Report."

The report also showed skipjack landed in May at Yaizu by the pole-and-line fleet totaled 6,674 metric tons, while purse seiners landed 232 tons of skipjack and 139 tons of yellowfin.

The Agency's report for May 26-31 showed that fishing picked up over a wide area. Since May 26, albacore were reported being taken in large quantities, up to 30 tons a day by some vessels, in the grounds extending from longitudes 137°-144° E. between latitudes 30°-33° N. Skipjack tuna fishing was reported good also, with vessels averaging 50-100 tons a trip. (Fishing Condition Rapid Report, Nos. 5-10, May 1966.)

SUMMER POLE-AND-LINE ALBACORE FISHING IMPROVES:

The Japanese summer pole-and-line fishery showed some improvement towards mid-June 1966, with daily landings over 300 short tons. During June 14-16, a total of 1,212 tons was landed at the tuna ports of Yaizu and Shimizu. The increased landings served to reduce prices by about US\$10 a short ton during the three-day period. Large albacore were quoted June 16 ex-vessel at 186-188 yen a kilogram (\$469-474 a short ton). (Miscellaneous Japanese trade journals.)

TUNA PURSE SEINER HAS SUCCESSFUL TRIP:

The 255-ton Japanese purse seiner Nissho Maru owned by a Japanese whaling firm landed, in a 30-day period, a total of 255 metric tons of skipjack and yellowfin tuna valued at 27.7 million yen (US\$77,000). The vessel operated off Cape Nojima, Chiba Prefecture, south to Hachijo Island (33°06' N.-139°49' E.).

Japan (Contd.):

On her first set on May 26, she caught 63 tons of tuna.

The vessel was originally scheduled to operate in the western central Pacific in the area of latitude of 10° N. between longitudes 140°-160° E. in April of this year, but the trip was cancelled due to problems associated with her freezing system. She is scheduled to explore those grounds for skipjack beginning in November.

The usual two-boat purse-seining operation requires a complement of about 60 men but the Nissho Maru, which is equipped with a power block, carries only 17 men. In addition, she is equipped with a brine-freezing system. To further increase the vessel's fishing efficiency, the company plans to construct a 90-ton auxiliary vessel to be used for scouting as well as a transport vessel to haul the catches to Japan. (Suisan Keizai Shimbun, July 11, 1966.)

PORTABLE-BOAT-CARRYING TUNA MOTHERSHIP FISHERY REGULATIONS LIBERALIZED:

The Japanese Fisheries Agency on June 16, 1966, announced a partial revision of the regulations governing the operation of portable-boat-carrying tuna motherhips. Under the revised regulations, vessel tonnage withdrawn from the portable-boat mothership fishery will henceforth be permitted to be used for the construction of large distant-water tuna vessels. The Agency also expanded the operational areas for the portable-boat-carrying mothership fishery, and they now include the Pacific Ocean east of 170° W. longitude north of the equator and east of 160° E. longitude south of the equator, the Indian and Atlantic Oceans. The liberalization of regulations is aimed at assisting operators overcome management difficulties arising from declining catches, longer fishing trips, and rising labor and material costs. (Suisan Keizai Shimbun, June 20, 1966.)

FOREIGN TUNA VESSEL LANDINGS INCREASE:

Beginning in 1966 there was a sharp increase in the number of foreign tuna vessels (mainly Okinawan and South Korean) landing their catches directly in Japan. This devel-

opment was attributed to the large demand for tuna and billfish for the domestic fresh fish trade. Species in demand in Japan are bluefin and big-eyed tuna and striped marlin.

In 1965 a total of 2,564 metric tons was imported, mainly from Okinawa, South Korea, and Formosa. Small quantities were imported from the United States (135 tons) and from American Samoa (72 tons). (Suisan Tsushin, June 13, 1966.)

TO COOPERATE IN INTERNATIONAL SKIPJACK TUNA INVESTIGATION:

It was reported that the Japanese Fisheries Agency plans to participate in the proposed international cooperative skipjack tuna investigation to be conducted by the Inter-American Tropical Tuna Commission, the United States, and France, and will seek funds for the joint program in its 1967 budget request. Reportedly, a broad outline of the joint investigation was to be developed at the Eleventh Pacific Science Congress at Tokyo in August 1966. The Agency hopes to assist the depressed Japanese tuna fisheries by encouraging the exploitation of skipjack tuna, a wide and far-ranging species, which abound in the world's tropical waters and which remain largely underutilized. As part of the cooperative effort, Japan plans to charter a 300-ton fishing vessel to tag about 12,000 fish and to collect data on age, growth, gonad development, and oceanographic conditions from the waters extending from Kagoshima in southern Japan to the Sanriku area in northeastern Honshu between April-September 1967. (Suisan Keizai Shimbun, July 14, 1966.)

USE OF REELS INCREASED FOR HAULING TUNA LONG LINES:

The use of reels on Japanese tuna vessels for handling long-line gear is increasing. A major Japanese fishing firm has already equipped two vessels, the Eiko Maru (310 gross tons) and the Eikei Maru (1,500 gross tons), with the new line-hauling equipment. Based on the success of operation of these two vessels, this and other tuna-fishing companies plan to modernize 10 long-line vessels. (Fisheries Attache, U. S. Embassy, Tokyo.)

Japan (Contd.):

SKIPJACK TUNA

HEADING MACHINE DEVELOPED:

The Research Department of the Yaizu Katsubushi (dried skipjack loin) Processors Association conducted on June 22, 1966, a public demonstration of the skipjack tuna heading machine it has been developing for several years. Skipjack ranging in size from 4-9 pounds were used in the demonstration. The machine processed fish at the rate of 22 fish per minute or about three times faster than a person could manually.

The machine, constructed of aluminum alloy, is 110 inches long, 55 inches high, 46 inches wide, weighs 880 pounds, and is powered by a 2-horsepower engine. The diameter of the steel blade is 12 inches. A chain conveyor system feeds the fish into the header. The machine sells for 270,000 yen (US\$750). (Kanzume Nippo, June 22, 1966.)

NEW FREEZER SYSTEM INSTALLED ON TUNA VESSEL:

A Japanese fishing company has installed on its 400-ton tuna long-liner Hoko Maru No. 51 a completely new type of freezing equipment designed to greatly improve efficiency and fish quality. Called the "trolley conveyor automatic freezing system," it involves overhead tracks and air-blast freezing equipment. Tuna, hung by their tails on the trolley, are conveyed into the air-blast freezer, frozen, then automatically glazed and transported to the cold-storage room for storage. It is reported that only one man is required to operate the equipment.

Other modifications made on the vessel include a power-reel device for setting and hauling long-line gear. As a result of these changes, the Hoko Maru will only require a crew of 23 as compared to 31 before the conversion. (Nihon Suisan Shimbun, June 24, 1966.)

PURCHASE OF ALASKAN SALMON:

The Japanese Government on July 22, 1966, accepted the special invitation extended by Governor Egan of Alaska to send vessels to purchase salmon from Alaskan fishermen and approved the applications of five major fishing companies to divert to Alaska

their stern trawlers operating in the Gulf of Alaska. It was reported the first Japanese vessels to arrive in Alaska were the stern trawlers Taiyo Maru No. 82 (2,866 gross tons) and the Daishin Maru No. 12 (2,967 gross tons), which arrived at Homer, Cook Inlet, on the morning of July 24. Three other trawlers were scheduled to arrive in Alaskan ports on July 25. They were the Akebono Maru No. 72 (3,500 gross tons), Takachiho Maru (3,495 gross tons), and the Ryuyo Maru (1,950 gross tons). The five vessels were expected to engage in fish buying, mainly pink salmon, through August 10. (Suisan Tsushin, July 25, 1966.)

(Editor's Note: Early reports indicated that the pink salmon run was not as good as expected and that the vessels had been able to purchase only a relatively small number of fish.)

NORTH PACIFIC SALMON FISHING CONDITIONS AND TRENDS:

Salmon fishing in Area B off Japan was described as good and the Japanese salmon catch in Area B as of June 17 was reported close to 40,000 metric tons (83 percent of the 48,000-ton quota). In anticipation of the quota being reached soon, the Japanese Fisheries Agency announced that the long-line fishing season was to be closed June 23 instead of June 30 as planned. The closing date for issuing permits to the land-based gill-net vessels to enter Area A was moved up several days from the original closing date of June 28.

The 11 Japanese salmon motherships operating in Area A as of June 18 were reported to have caught 17,000 metric tons of fish (43 percent of the 38,981-ton quota). Species composition of the mothership catch as of June 14 was reported to be 52-53 percent reds, 44-45 percent chums, and the remainder pinks. On July 12, the mothership fishery was ended, the earliest closing date for the fishery since the end of World War II, the quota of 38,981 tons having been reached. The season's species composition for the total catch was reported as 40 percent reds, 45 percent chums, 12 percent pinks, and 3 percent silvers and kings. Abundance of pinks and chums was unexpectedly good and the size of the chums was larger than average. Failure of the Bristol Bay red salmon to appear in significant numbers in the Japan-

Japan (Contd.):

ese catches was disappointing. The silver salmon catches were low because of the early closing date. It was expected that the fleets showing the most profit for the operation would be those that moved a minimum distance during the season. (Fisheries Attache, United States Embassy, Tokyo, July 12, 1966, and various press and other sources.)

At the beginning of the season, for about 10 days, 10 of the 11 Japanese salmon fleets were concentrated in the central fishing grounds (latitudes 48° - 51° N., longitudes 167° - $173^{\circ}30'$ E.) but began to disperse from about May 30 and move eastwards to intercept the Bristol Bay run of red salmon. The movement eastward was initially led by Nichiro's three fleets, which moved to the waters south of Kiska Island.

Weather conditions were bad on May 29-30. The catch in the central grounds up to that time averaged 60-70 metric tons per fleet per day, but with the approach of bad weather declined in some cases to as low as 42-43 metric tons per day per fleet. The catch consisted of about 60 percent reds. The size of fish, both reds and chums, was reported large in comparison to those taken usually.

Following the movement of Michiro's three fleets to the west longitudinal (east of 180°) fishing grounds, within a week the remaining fleets moved eastward and in early June were strung along the area latitudes 48° - 51° N., longitudes $167^{\circ}30'$ E.- 177° W., awaiting the appearance of Bristol Bay fish but the expected run did not materialize.

In early June those fleets fishing in the eastern longitudinal grounds (west of 180°) close to the 180° meridian were averaging about 50 metric tons per day per fleet. The proportion of reds in their catch was reported less in comparison to the catch of those fleets operating in the southeast, also in the eastern longitudinal grounds.

Towards mid-June three fleets (Shinano Maru, Meisei Maru No. 2, and Miyajima Maru) had moved to the south of the Aleutian Islands in the western longitudinal grounds. One fleet (Otsu Maru) was operating along longitudes $163^{\circ}30'$ E. The remaining seven fleets were fishing between these two groups in the central fishing grounds.

Near mid-June the entire fleet was averaging 60-70 metric tons per day per fleet. The three fleets operating in the western longitudinal grounds have not encountered any sizable run of North American reds.

Their catches averaged 40 percent reds and 60 percent chums. In contrast the fleets operating in the central grounds were averaging 60 percent reds and 40 percent chums.

It was reported that the run of Bristol Bay reds appeared to have been delayed this year as a result of a cold water mass which confined the movement of the reds in the waters south along the Aleutian chain. Mothership operators were concerned over this situation inasmuch as it would seriously affect the success of their fishing operations as these fish may not become available to their fleets.

The catch of Asian reds and chums was reported good and to be at about the same level as the 1963 catch.

VIEWS ON NORTH PACIFIC MOTHERSHIP SALMON FISHING SEASON:

Japanese fleet operators who participated in the 1966 North Pacific mothership salmon fishery were interviewed by several trade papers. Their views concerning this year's salmon operation are summarized below:

1. The expected migration of Bristol Bay red salmon west of the provisional line did not develop but red salmon of Asian origin were abundant. One trade periodical reported the reds to be mainly of east Kamchatkan origin.
2. Chum salmon were abundant contrary to expectations. Being an even year, the pink runs were expected to be poor but they appeared everywhere and the runs to the Olyutorskii region (on the Siberian coast) seemed particularly good. Silver salmon landings were small due to the early termination of fishing operations.
3. The sea-surface temperature was cold at the outset of the fishing season but towards late May climbed to normal levels and fishing in the central area began to pick up.
4. The catch composition of the entire fleet was estimated by one source as 40 percent reds, 47 percent chums, 8.4 percent

Japan (Contd.):

pinks, and 4.6 percent kings and silvers, while another claimed it to be 45 percent reds, 47 percent chums, and 8 percent pinks, silvers, and kings.

5. The reds and chums were larger in size than usual. Towards the middle of the season, the reds averaged 2.3 kilograms (5 lbs.) per fish, with the larger fish running to 3 kilograms (6.6 lbs.). Chums ranged 2.3-2.6 kilograms (5.1-5.7 lbs.) per fish.

6. The newly established closed area (bounded by north latitudes 48°-52° and east longitudes 160°-165°, which was closed to fishing July 1-14) hardly had any effect on fleet operations since fishing was good elsewhere and the catch target was met early. (The fishery ended on July 12, the earliest in many years.)

7. The weather was good and the 11 fleets were able to fish almost continuously. Only one catcher vessel was lost without loss in lives, but there were five fatal accidents in the entire fleet. (Suisan Keizai Shimbun and Hokkai Suisan, July 25; Suisan Tsushin, July 23, 1966.)

SALMON CATCHER VESSELS LAID-UP:

As a result of the early closure (July 12) of the high-seas salmon fishery, the catcher vessel owners were at a loss to know how to use their vessels. Usually the salmon fishery lasts into mid-August and the vessels then fish for saury, bottom fish (trawl), or cod (long line). This year the owners had an extra month's time for which work for their vessels needed to be found. (Fisheries Attache, United States Embassy, July 28, 1966, from Suisan Keizai, July 19, 1966.)

DEVELOPMENTS IN SALMON AND TROUT CULTURE:

The Miyagi Prefectural Experimental Station has been conducting experiments on the culture of salmon and rainbow trout at sea. The fish were held in cages of seven cubic meters in size and suspended at a depth of 10 meters. They were introduced in the cages (number not given) and fed an artificial diet. In 20 months, the 200 rainbow trout remaining in the experiment had grown to a size 5

times that of wild fish kept in fresh water. The meat was red and of excellent flavor. Salmon (species not given) were also reared in the same way. The 400 remaining after 18 months had reached an average size of 500 grams or about 50 percent greater than wild fish in the ocean. The flavor was not as good, however, as that of wild fish.

The Japan Salmon Resources Conservation Association has asked the Fisheries Agency to take whatever steps are necessary to increase salmon hatchery production to 1 billion eggs a year. (Fisheries Attache, United States Embassy, Tokyo, July 13, 1966.)

EXPORTS OF FROZEN RAINBOW TROUT, APRIL 1966:

In April 1966, Japan exported a total of 246.1 short tons of frozen rainbow trout valued at US\$168,937. This amount is almost identical with the 246.1 tons exported in the previous month but the export value is considerably less, being about \$10,843 below the value reported for March. (Fisheries Attache, United States Embassy, Tokyo, June 24, 1966.)

Japan's Exports of Frozen Rainbow Trout by Country of Destination, April 1966		
Destination by Country	Qty. Short Tons	Value US\$
United States	149.1	101,444
United Kingdom	41.6	26,319
Belgium	11.9	8,261
Canada	26.0	19,769
Netherlands	9.3	7,142
West Germany	4.0	2,775
Australia	0.6	433
Sweden	3.6	2,794
Other	-	-
Total	246.1	168,937

EXPORTS OF CANNED SALMON JAN.-MAR. 1966:

In March 1966 Japan exported a total of 1,211 metric tons of canned salmon valued at US\$2,224,636. There was a continuing increase in exports of canned salmon in the first three months of 1966: January 841 tons; February 1,102 tons; March 1,211 tons.

The United Kingdom received 88 percent of the March exports from Japan; Australia received about 8 percent; and Belgium about 3 percent. Exports to all other countries

Japan (Contd.):

were negligible. (Fisheries Attache, United States Embassy, Tokyo, June 24, 1966.)

EXPORTS OF CANNED CRAB MEAT, MAY 1966:

In May 1966, Japan exported a total of 3,206 cases (48½-lb. cans each) of canned crab meat. No canned king crab was exported in May and none of the other kinds of canned crab was exported to the United States. The United Kingdom purchased 805 cases and France received 1,740 cases. The remainder of 661 cases went to "other" countries. (Fisheries Attache, United States Embassy, Tokyo, June 24, 1966.)

DOMESTIC MARKET PRICES FOR 1966 CANNED SALMON AND KING CRAB:

Here are the official quotations for the new pack of Japanese "Akebono" canned chum salmon and king crab produced by one Japanese firm for sale on the local market:

Product and Can Designation	Can & Case Size	Price	
		Wholesale 1/	Retail
		. . (US\$/Case). .	
Salmon, chum, flat No. 2 can	1/2-lb., 48's	15.33	18.00
Salmon, chum, flat No. 3 can	1/4-lb., 96's	17.60	21.33
King crab, gold label No. 1 can	13-oz., 24's	33.33	39.33
King crab, gold label No. 2 can	6-1/2-oz., 48's	37.33	44.00
King crab, red label No. 2 can	6-1/2-oz., 48's	30.00	36.00
King crab, blue or green label	6-1/2-oz., 48's	28.00	33.33
King crab, purple label No. 2 can	6-1/2-oz., 48's	24.67	29.33
1/16 small quantities.			

(Fisheries Attache, United States Embassy, Tokyo, July 12, 1966.)

FROZEN FISH PRODUCTION IS HIGH:

Japan's frozen fish production in 1964 was 10 times greater than in 1941, the last pre-war year. In 1964, 1,350,000 metric tons of frozen fish were produced--770,000 tons from the coastal fisheries and 580,000 tons from the high-seas fisheries. This was 28 percent of the total catch for 1964. Ranked by species, the catch shows tuna as the most important, followed by broadbill swordfish,

saury, squid, and mackerel. (Fisheries Attache, United States Embassy, Tokyo, July 13, 1966.)

VIEWS ON FIFTH JAPAN-U.S. TRADE AND ECONOMIC COUNCIL MEETING:

The fifth meeting of the Japan-U.S. Trade and Economic Council was held in Kyoto, Japan, July 5-7, 1966. It was reported that the Japanese Fisheries Agency felt the discussions were highly productive and that the meeting generally achieved its original objectives. The Agency's views were reported as follows:

1. Japan-U.S.-Canada Fisheries Treaty revision: The United States seemed to have held the view that it was Japan's turn this time to make proposals. However, it turned out that the United States concurred in Japan's view that "there is no solution other than to discuss the problem politically at a cabinet level." Negotiations will hereafter likely be conducted through diplomatic channels in preparation for an early opening of formal talks in order to reach an early settlement, which would be desirable.

2. Bartlett Bill on 12-mile exclusive fishing zone (S. 2218): The United States, in formal talks, did not explicitly state she would recognize Japan's traditional fishing rights, but did state there would be no real harm done to Japan. Therefore, in any future discussions between the two countries on specific problems, it is believed that on the basis of the statement made by the United States, Japan should be able to adequately develop her position.

3. Bristol Bay king crab agreement: The United States showed no particular indication of disapproval with respect to Japan's request for a simple extension of that agreement, and expressed the desire that discussions be conducted on the basis of scientific studies of the resource. Therefore, it can be expected that the United States has intentions of continuing the arrangements provided in the present agreement. (Suisan Tsushin, July 9, 1966.)

JETRO GETS \$940,000 TO PROMOTE EXPORT SALES:

The Japan Export Trade Promotion Organization (JETRO) has been allocated for

Japan (Contd.):

fiscal year 1966 (April 1966-March 1967) a budget of 338.6 million yen (US\$940,000) for promoting Japan's export trade in agricultural and marine products. One-third of the total budget has been allocated for the mass media promotion of pearls and tuna, as follows: tuna promotion 48.5 million yen (\$132,000) to be spent in the United States and 6 million yen (\$17,000) in Europe; pearl promotion 20 million yen (\$56,000) to be spent in the United States and 30 million yen (\$83,000) in Europe. In addition, 36.3 million yen (\$100,000) has been budgeted for the support of JETRO personnel stationed in Long Beach, Puerto Rico, American Samoa, and in Venice, Italy. Their duties include inspecting deliveries of Japanese frozen tuna to minimize and adjust claims against shipments and reporting on fishing, production, and marketing trends. (Suisan Keizai Shimbun, July 6, 1966.)

1965 WHITE PAPER ON TRADE
MENTIONS FISHERY PRODUCTS:

The Japanese Ministry of International Trade and Industry released in June 1966 the 1965 "White Paper on Trade." According to the White Paper, Japan's food exports in 1965 totaled in value US\$344 million--a 6.7-percent increase over 1964 exports valued at \$322 million. Exports of fresh and frozen marine products decreased 1.3 percent due to the decline in exports of frozen tuna. Exports of processed fish showed a remarkable increase in canned salmon sales (which rose 43 percent in value), but the overall gain was only 6.2 percent due to the decline in exports of canned tuna, mackerel, saury, and crab.

1. Frozen Tuna Exports: Japanese frozen tuna exports in 1965 totaled 165,000 metric tons, valued at \$52 million--a decrease of 5.6 percent in quantity and 7.7 percent in value from 1964 exports. This decline is attributed to lower catches and to sluggish albacore exports resulting from depressed export prices in early 1965. Frozen tuna exports to Italy showed a 26-percent increase in value, owing to that country's improved foreign currency situation and to brisk tuna demand. On the other hand, exports to the continental United States, Puerto Rico, and American Samoa, respectively, dropped in value by 17, 7.5, and 6.5 percent. The decline in exports to the United States was due primarily to poor fishing conditions in the

Atlantic, depressed frozen tuna prices, and to increased shipments of Atlantic catches back to Japan where demand was rising.

By species, skipjack exports, though small in quantity compared with other tuna, increased twofold. Exports of albacore and yellowfin (the two most important species) increased in quantity by 5 percent but decreased in value by 8 percent. Tuna loin exports to the United States decreased in value 18 percent from 1964 exports.

Tuna demand in foreign countries is steadily increasing, but due to production problems confronting Japanese producers, a significant growth in frozen tuna exports cannot be hoped for. In order to expand exports, more positive efforts should be exerted to develop the tuna resources, conduct marketing research abroad, strengthen the frozen tuna sales system, and improve production facilities and management efficiency (by reducing manpower costs). At the same time, Japan must develop measures to counter the competition offered by other fishing countries, such as South Korea, Taiwan, and the Soviet Union, which are expanding their fisheries.

2. Canned Tuna Exports: Japanese canned tuna exports in 1965 totaled 43,000 metric tons (94.6 million pounds) valued at \$36 million, down 2.1 percent in quantity and 5 percent in value from 1964. This decrease was due to the decline in canned tuna-in-brine exports to the United States, which normally account for around 50 percent of Japan's canned tuna exports. Canned tuna-in-brine exports to the United States declined by 5.9 percent in quantity and 13 percent in value, indicating the expansion of canned tuna production in Puerto Rico. Exports to West Germany and Canada have grown remarkably, with West Germany buying more institutional packs because of lower costs and Canada importing more albacore packed in oil. Canned tuna exports to other countries were stagnant, due to poor catches of tuna species other than albacore, with the result that supply ran low and prices increased.

Japan's ability to supply canned tuna cannot be said to be adequate due to factors restricting canned tuna production, such as the extension of fishing grounds to more distant waters in recent years and the increasing quantity of frozen tuna exported to foreign countries. Besides, increasing productivity would not absorb much of the increased oper-

Japan (Contd.):

ating expenses stemming from higher raw material and labor costs. These factors, therefore, tend to lower Japan's international competitive position.

Meanwhile, world demand for canned tuna is likely to continue to grow. Japan must strive to firmly maintain her export market by securing a steady supply of raw material, reduce costs, improve quality, and strengthen her sales system. (*Nihon Suisan Shimbun*, July 4; *Suisan Keizai Shimbun*, June 28, 1966.)

CONCERN ABOUT FISH DEPLETION
IN HOME WATERS:

In late June, the Japanese Fisheries Agency released a statement to the effect that the fishery resources close to Japan have been greatly depleted due to "reckless fishing." For this reason, the Agency said, it is essential that Japan develop new fishing areas around the world. (Fisheries Attache, United States Embassy, Tokyo, July 13, 1966.)

EXPLORATORY FISHING IN
NORTH ATLANTIC WATERS:

The Japanese Fisheries Agency on June 30, 1966, authorized a fishing company to test-fish in the western North Atlantic with the 370-ton trawler *Taiyo Maru No. 32* for one year beginning July 1, 1966. The vessel has been licensed to operate in the area west of longitude 40° W. between latitudes 10° N. and 50° N. Her ports of landing have been designated as St. Georges, Newfoundland, St. Pierre Island (off Newfoundland), and Port of Spain, Trinidad.

In 1963-64, the same company conducted test-fishing in the Northwest Atlantic with the converted 3,700-ton trawler *Tenyo Maru No. 3* without much success. Doubts were raised at that time whether an all-year operation would be feasible. For this reason, the *Taiyo Maru* this year will be used to develop new fishing grounds and is scheduled to explore the waters off Florida for sea bream. In the spring and summer, the vessel will test drag for shrimp south of 50° N. latitude. (*Shin Suisan Shimbun*, July 4, 1966.)

EXPLORATORY FISHING IN
INDIAN OCEAN:

The Japanese Fisheries Agency will conduct experimental fishing in the Indian Ocean off South Africa and Madagascar for red and yellow sea bream, bottom sharks, and other fish. The *Eidai Maru* (474 tons) will be chartered for those studies. The catch target is set at 79.2 metric tons. (Fisheries Attache, United States Embassy, Tokyo, July 13, 1966.)

SHRIMP FISHING OFF AUSTRALIA GOOD:

A Japanese fishing company, which was licensed to fish on an experimental basis for shrimp with a fleet of five vessels (1 carrier vessel and 4 catcher vessels) from the Equator south to 18° S. latitude between east longitudes 123°-147°, dispatched on May 30 the 300-ton vessel *Suruga Maru* and 95-ton trawler *Kyoshin Maru No. 12* to the Gulf of Carpentaria off the northern coast of Australia. The vessels commenced exploratory fishing June 15. Initial test-fishing results were only fair but the *Kyoshin Maru* was reported in late June to be averaging daily catches of nearly 700 pounds of quality shrimp off Cape York, Australia. As a result, it was anticipated that the company would dispatch additional vessels to the Gulf of Carpentaria. (*Minato Shimbun*, July 1, 1966 & other sources.)

EXPLORATORY FISHING OFF AUSTRALIA:

Exploratory fishing, conducted off Australia by the Japanese Fisheries Agency, has been under way since September 1965 using the research vessel *No. 1 Suruga Maru* (339 tons). There are extensive areas around Australia that contain good fishing grounds. The season between January and March provided the best catches even though the seas were rough. Long lines did not pay because of damage by sharks. (Fisheries Attache, United States Embassy, Tokyo, July 13, 1966.)

MINCED-FISH INDUSTRY GROWING:

For a number of years the Japanese fishing industry has been producing minced fish as a raw material for fish sausage and similar products. The ground meat of fish is frozen and sold to processors. Because of the growth of the minced-fish industry, the companies will create a National Council to set standards for the minced fish made by

Japan (Contd.):

factoryships and for the further promotion of the industry. Recently, two of the factoryships changed the production process, reducing the amount of sugar added by half and adding a solution of grape sugar. This new process reportedly reduces the sweetness, extends the usage, and prolongs storage life. The first of this improved product, about 600 metric tons, was to be brought into port about mid-July 1966.

The Central Research Laboratory of a major Japanese company has succeeded in producing minced fish from fresh-water species. This work was done for the Fish "Ham" Association. (It was reported that heretofore there was a taste problem when fresh-water fish were used.)

Production of minced fish in Hokkaido is suffering from a price decline. Production includes 30,000 metric tons of Alaska pollock and about 15,000 tons from factoryships. In addition about 4,000 tons have been produced from croakers and horse mackerel caught in the East China Sea. The Hokkaido industry is finding it difficult to keep up the quality comparable to that produced at sea. (Fisheries Attache, United States Embassy, Tokyo, July 8, 1966.)

SOVIETS FISHING OFF
JAPANESE COAST:

On July 10, 1966, two Soviet fishing vessels were reported fishing about 15 miles off the northern coast of Honshu. The vessels were reported to be of steel construction and about 500 gross tons in size. They were fishing with long lines for squid--the first time the Soviets have been observed fishing for squid near the coast of Japan. Earlier announced plans for 1966 by the Soviets indicated that they would fish for saury, squid, and mackerel near the coast of Japan. (Fisheries Attache, United States Embassy, Tokyo, July 15, 1966.)

CENSUS OF POPULATION
ENGAGED IN FISHERIES:

The continued decline in the Japanese engaged in the fisheries appears to have been halted in 1965, according to census figures released by the Japanese Government. The

census shows that the fishery population in 1965 totaled 612,000, the same as in 1964. Compared to the 1961 population of 699,000, the 1965 population is down 12 percent. The number of households engaged in fisheries in 1965 for a period of over 30 days during the year totaled 389,000, as compared to 392,000 in 1964, and household members totaled 2,050,000. Self-employed households numbered 258,000. Of the total population, 24 percent was engaged in shallow-water culture, 68 percent in the coastal and off-shore fisheries, and 8 percent in the distant-water fisheries. (Nihon Suisan Shimbun, July 20, 1966.)

NEW KNOTLESS NET:

New knotless nets ("clemona F"), in Danish seines, have been in use for 1 to 2 years in the fishery for mackerel and horse mackerel. Catches were good. The fishermen have stated that the net proved to be extremely durable (even when sharks were taken in the net). One company has used the net for 26 months without any noticeable decrease in the tensile strength. They plan to use the nets for some months more. (Fisheries Attache, United States Embassy, Tokyo, July 28, 1966, from Suisan Keizai, July 18, 1966.)



Republic of Korea

TRAINING VESSEL SURVEYS
NORTH PACIFIC:

The Republic of Korea's Pusan Fisheries College dispatched to the North Pacific in July the 389-ton training vessel Paik Kyung Ho on a three-month exploratory and training cruise. Reportedly, the vessel was to seek such species as salmon, flatfish, and Alaska pollock.

The vessel's crew included a scientific party of 10 and 34 trainees. The vessel called at the Japanese port of Fukuoka before departing for the waters off Hokkaido to test fish for salmon with gill nets. She was scheduled to later proceed to the Aleutian Islands, call at Dutch Harbor, and to survey the adjacent waters.

This is the first year that the Republic of Korea sent a vessel to the North Pacific. It was reported that the vessel was assigned to

Republic of Korea (Contd.):

explore the North Pacific due to: (1) intensive competition on the fishing grounds off South Korea; (2) numerous international restrictions in the East China Sea; (3) the declining catch trend in the South Pacific tuna grounds where about 100 tuna vessels were operating. In view of these developments, it had become necessary to find substitute fishing grounds as soon as possible. (Minato Shimbun, July 24, 1966.)

U.S. CANNER TO USE KOREANS TO FISH TUNA IN SOUTH ATLANTIC:

According to fishing circles in Japan, a U. S. tuna canning company with a plant in Puerto Rico has decided to start fishing for tuna with Korean fishermen in order to secure a supply for its cannery. The canning company, considered among the top three, has purchased as a first step three used fishing vessels (250-ton class, probably long-liners) from Japan. The company was recruiting fishermen in South Korea in order to start fishing in the Atlantic Ocean by the fall of 1966. It is believed that the company plans to obtain about 28 fishing vessels, and such a fishing operation may affect the export price of tuna from Japanese vessels fishing in the Atlantic.

The reasons for the company's decision were said to be as follows: Because of the low export price of tuna in the Atlantic during the latter part of 1965, many Japanese fishing vessels left the fishing grounds in the Atlantic to go to the Indian and Pacific Oceans, resulting in a large decrease in the supply of tuna. Thus it was difficult for the company to obtain sufficient fish for its cannery. (Fisheries Attache, United States Embassy, Tokyo, July 15, 1966 from Yomiuri Shimbun, July 12, 1966.)



Libya

THREE TUNA LONG-LINERS IMPORTED FROM JAPAN:

A fishing company at Shimizu, Japan, has contracted to export to Libya three of its tuna long-line vessels, Seiju Maru Nos. 8 (484 gross tons), 14 and 19 (each of 99 tons). The vessels, which were sold to a Libyan fish

cannery in Tripoli at a total cost of 120 million yen (US\$333,000), departed for Libya July 16, 1966.

Under a three-year employment contract signed between the Japanese and Libyan companies, the three vessels will be crewed by 70 Japanese nationals who will be rotated by air transport after 18 months. The contract calls for monthly salary payments of 190,000 yen (\$528) for fishing captain; 170,000-180,000 yen (\$472-500) for captain, chief engineer, and chief communication officer; and 73,000 yen (\$203) for a deckhand. (Note: One periodical listed the salaries as \$503 for fishing captain, \$480 for captain, and \$186 for deckhand, plus a production bonus of \$10 per ton of tuna.) It was reported that the comparatively high salary schedule for the crew was arrived at after consultations held with the Japan Seamen's Union and by taking into consideration the wage base of the International Transport Federation and the special nature of fishing labor.

The crew will not be covered by the Japan Seamen's Law and hence will not be eligible for accident compensation. Under the terms of the wage contract agreement, the Libyan firm will be wholly responsible for their medical expenses arising from any work-connected injuries. (Katsuo-Maguro Tsushin, July 20; Suisan Keizai Shimbun, July 21, 1966.)



Malaysia

FISHERMEN'S SUBSIDY:

The Ministry of Agriculture and Cooperatives announced April 5, 1966, the allocation of M\$500,000 (US\$165,000) to help fishermen buy boats and equipment for deep-sea fishing. The subsidy will be given through fishermen's associations which are to be set up. Although the Ministry did not specify the type of deep-sea fishing to be encouraged, it probably intends to assist more fishermen to develop a capability for trawling. Trawling licenses have been severely limited in Malaysia over the past year because of conflicts between in-shore fishermen and trawlers. The Malaysian Government now apparently feels that the controls that have been set up to insure that trawlers do not fish grounds reserved to in-shore fishermen are reasonably effective and is now prepared to encourage more fisher-

Malaysia (Contd.):

men to engage in deep-sea fishing. (United States Embassy, Kuala Lumpur, April 12, 1966.)

**Mauritania****CLARIFIES DECLARATION ON EXCLUSIVE FISHERY ZONE:**

The Government of Mauritania, in an oral statement delivered to the Japanese Embassy in Dakar, was reported to have clarified its declaration concerning the establishment of an exclusive fishery zone, as follows: Effective May 1966 the territorial sea of Mauritania will include the waters six miles from shore measured from the low-water mark and the exclusive fishing zone will include the adjacent waters six miles beyond the territorial sea. Spain and France will be permitted to fish in certain localities in the exclusive fishery zone, but the operation of foreign vessels other than those approved for operation in the zone based on certain conditions, e.g., they land their entire catches in Mauritania for processing, will be prohibited. Violators will be fined from 200,000 to 4 million francs and their vessels, gear, and catch will be confiscated. (Minato Shim-bun, July 12, 1966.)

**Mexico****SPINY LOBSTER AND ABALONE DEVELOPMENT POTENTIAL IN BAJA CALIFORNIA:**

The northernmost fishery port in the Territory of Baja California is located at Bahia Tortolo (also known as Bahia Tortugas, Turtle Bay, or Puerto San Bartolome). Located here, on the best protected harbor on the Territory's Pacific Coast, is a thriving abalone cannery and a shipping facility for spiny lobsters. Both species are taken by the several fishermen's cooperatives along the rocky coast and at nearby Isla Natividad. The cannery receives its supplies by the same small vessel that hauls the canned abalone to Ensenada where company headquarters is located. The lobsters are shipped alive by small plane to the cooking and freezing plant in Ensenada.

Although much less important than frozen shrimp, which is Mexico's most important fishery export item, abalone and spiny lobsters are second and third in value. All the abalone, both canned and frozen, and nearly all the spiny lobsters are produced along the Pacific Coast of the two halves of Baja California.



Fig. 1 - Typical DUKW or amphibious "duck" used to load and unload vessels where no docking facilities exist.

Additionally, large and growing quantities of canned abalone are sold in mainland Mexico. Although both abalone and lobsters are exploited heavily, it should be possible to increase the harvest somewhat. Better transportation facilities would enable the establishment of additional shore bases in places the fishermen cannot reach at present. Improved equipment and boats could result in some increase in lobster catches. Far in the future, but foreseeable, is an increase in the production of abalone by means of the artificial culture techniques now being developed in Japan.

Asuncion, sheltered by the point and island of the same name, is a fishing village of about the same size and importance as Turtle Bay. The town of 1,500 people is supported entirely by the abalone cannery and the lobster camps. The cannery and the entire town receive all supplies by ship from Ensenada. The canned abalone is carried to Ensenada aboard the same ship. Spiny lobsters are flown alive to Ensenada. There is no wharf at Asuncion; all unloading and loading of supplies and canned abalone, as well as unloading of catches, are done by lighters, in this case a "fleet" of amphibious "ducks." The abalone cannery has its headquarters in Ensenada and operates at full capacity, selling every case it packs.

Mexico (Contd.):



Fig. 2 - Spiny lobster plant at Ensenada, Baja California.

Several possibilities for development have real promise. Under present conditions, it is necessary that all lobsters be shipped alive to Ensenada, where they are cooked and then exported either fresh or frozen. Shipping them alive by light plane entails a mortality loss of 15 percent. This could be obviated by cooking and freezing at the cannery in Asuncion. The cannery already has some freezing and cold-storage equipment which could be expanded readily, and cooking equipment could be added at little cost. Frozen spiny lobsters could be shipped by plane or by the ship serving the cannery, which has adequate refrigeration facilities. The growing trend in most of the world's spiny lobster fisheries is to ship the tails only in order to save freight costs. (U. S. Embassy, Mexico, D. F., April 29, 1966.)

* * * * *

INTEREST IN FISH PROTEIN CONCENTRATE FOR HUMAN CONSUMPTION INCREASES:

Interest is increasing in Mexico in the production of fish protein concentrate (FPC) for human consumption. One Mexican firm plans an investment of US\$128,100 in a plant, with operations scheduled to begin sometime this summer. The plant will be constructed at Ensenada, Baja California.

In the meantime, officials of a U. S. firm are engaged in a joint study with Mexican

Government and leading industry officials on the establishment of a US\$100,000 plant to produce FPC. The plant would consist of 4 units and would produce both liquid and solid FPC, as well as FPC for human and animal consumption. The second plant would be built in Salina Cruz, Mexico. (Various sources, July 1966.)



New Zealand

FISH SAUSAGE, A NEW PRODUCT:

A smoked fish sausage has been developed at the Food Technology Department, Massey University of Manawatu, New Zealand, to provide a possible outlet for some varieties of fish of lesser commercial value. With some modifications, the formula has been based on the Japanese fish sausage. In July 1966, the Minister of Marine requested an advisory opinion from the U. S. Food and Drug Administration on the admissibility of the product. It is understood that a 200-pound sample shipment of the product is to be made to the United States.

Fish sausage manufacture has been an integral part of the Japanese fishing industry since 1953, providing a convenient food second in popularity to the fish cake. A production figure of more than 150,000 metric tons of fish sausage a year utilizes such fish as marlin, whale meat, some varieties of tuna, shark, squid, and mackerel.

Preservatives are used in the Japanese sausage, giving a storage life of 2 to 3 months at room temperature. Use of these preservatives is restricted in New Zealand so the New Zealand equivalent has a refrigerated storage life of one month only.

The fish trevally has been used in the New Zealand product, but may be replaced equally well by kahawai, mackerel, and possibly other varieties not yet tried. A percentage of smoked trevally has been added to give a smoked flavor; alternatively, the final product may be smoked if the appropriate casing is used.

This product has been made in the form of a luncheon product and, as such, may be served cold or as a heated food, fried in chunks.

New Zealand (Contd.):

Method of Preparation:

1 Skin, bone, and mince raw and smoked trevally--chill thoroughly.

2. Emulsify fat with tomato paste and approximately half water. Freeze remaining water.

3. Dissolve preservative and phosphate in a little water. (Phosphate trisodium phosphate.)

4. Using bowl chopper, mix minced fish, emulsified fat, preservative, and phosphate. Add ice.

5. Add milk powder, breadcrumbs, flour, salt, and spices. Blend thoroughly.

6. Extrude into casings. Cooking time and temperature are dependent on size and type of casing used. A clear 3-inch diameter "Glowrays" oxygen barrier casing was used. This requires $1\frac{1}{2}$ -2 hours' cooking in water at 165° F. (170° F. if steam is used). A colored casing, perhaps brown, would be an improvement in appearance over the clear casing.

7. Chill thoroughly and keep refrigerated.

Precautions to be Observed:

Storage time about 1 month at chill temperature.

Breadcrumbs should be 3-4 days stale.

Temperature of mix should not exceed 60° F., otherwise emulsion breakdown takes place and surface fat appears on the cooked product.

Thorough emulsification or blending of the fat is also necessary, otherwise emulsion breakdown takes place during cooking.

Gelling capacity of fish meat falls off during storage--good quality fish should therefore be used.

Rancidity flavors develop in trevally frozen for long periods. Three months' frozen storage should be a maximum and storage temperature should be -5° F. or less. (Com-

mercial Fishing, Wellington, May 1966, and United States Embassy, Wellington, July 11, 1966.)

**Norway**FISH MEAL AND OIL PRODUCTION AT RECORD LEVEL IN FIRST HALF OF 1966:

For the first half of 1966, the production of herring meal in Norway totaled 220,000 metric tons, an increase of more than 50 percent as compared with the same period of last year. Norway's total fish meal production in 1965 reached a record 309,000 tons.

Norwegian production of herring oil totaled 60,000 tons for the first half of 1966, compared to less than 40,000 tons for the first half of 1965. (The Export Council of Norway, July 1966.)

**Peru**FISH MEAL SITUATION, MID-JUNE 1966:

As of June 15, 1966, Peruvian fish meal production for the 1965/66 anchoveta fishing season, which closed officially on May 31, 1966, was 1,352,781 metric tons.

In the period January 1 to June 15, 1966, a total of 689,348 metric tons of fish meal was exported. The following 10 countries bought 86.6 percent of Peru's exports of fish meal.

Peruvian Exports of Fish Meal by Major Countries,
January 1-June 15, 1966

Countries	Percentage	Metric Tons
West Germany	17.5	120,910
United States	15.5	106,711
Netherlands	11.4	78,612
East Germany	8.4	57,589
Spain	7.3	59,487
Italy	6.6	45,632
Japan	6.0	39,610
Yugoslavia	5.4	37,430
Mexico	4.6	31,975
Poland	4.0	27,696

Stocks on hand on June 15, 1966, were 499,289 metric tons; on July 14, 1966, an estimated 70,000 tons remained unsold. On the latter date the price f.o.b. Callao was US\$152 a ton, compared with about \$190 a

Peru (Contd):

ton at the same time a year ago. However, in spite of a lower price at this particular time of year, the average annual price is expected to bring Peru a somewhat larger return from fish meal sales than the preceding season did.

For 1964, it is roughly estimated that 1.5 million tons of fish meal sold at an average price of about \$115 a ton. In 1965, 1.3 million tons of fish meal sold at about an average of \$140 a ton. An estimate for 1966 is 1.4 million tons at an average of about \$150 a ton. If this becomes a fact, Peru stands to receive the highest return for its fish meal in the short history of this industry. (U. S. Embassy, Lima, July 17, 1966.)

TAXES ON FISH MEAL
AND OIL EXPORTS:

Peruvian taxes on fish meal exports currently amount to 7 percent of the f.o.b. Peruvian port price. (This includes a 1-percent ad valorem tax, a 5-percent sales tax, and a 1 percent unemployment tax.) Other taxes on Peruvian fish meal exports have been temporarily suspended since July 8, 1964, and this reduction of taxes to the 7-percent level has stimulated production and exports.

Peruvian marine oil exports are subject to the same 7 percent tax package described above, plus a special tax which amounts to about US\$7.46 a metric ton for crude fish and whale oil and \$5.59 for semirefined fish and whale oil. (U. S. Embassy, Lima, July 14, 1966.)



South Africa

SHOAL FISH CATCH DOWN
DURING JAN.-MARCH 1966:

South Africa's Cape west coast shoal fish catch for the first three months of the 1966 season was 63,714 short tons pilchards, 8,410 tons maasbanker, 24,817 tons mackerel, 14,046 tons anchovy, and 3,909 tons red-eye. The total catch was 114,896 tons. In the same period of 1965 the total catch was 207,324 tons, made up of 146,646 tons pilchards, 19,874 tons maasbanker, 25,287 tons mackerel, and 15,517 tons anchovy. The first quarter's catch in 1964 was 205,247 tons, made up of

168,060 tons pilchards, 9,433 tons maasbanker, and 27,744 tons mackerel.

According to figures released by the Division of Sea Fisheries, the March catch for 1966 was 42,942 tons pilchards, 162 tons maasbanker, 15,417 tons mackerel, and 1,059 tons anchovy. The total catch was 59,968 tons. This compares with 95,044 tons pilchards, 1,809 tons maasbanker, 13,012 tons mackerel, and 14 tons anchovy in March last year; and with 56,850 tons pilchards, 6 tons maasbanker, and 17,751 tons mackerel in March 1964.

The March catch this year yielded 14,256 short tons fish meal, 715,336 imperial gallons fish body oil, 706,824 pounds canned pilchards, 144 pounds canned maasbanker, and 2,801,676 pounds canned mackerel.

In Walvis Bay, South-West Africa, by the end of March the total fish catch had reached 136,112 short tons. The total March catch was 92,000 tons pilchards and 605 tons anchovy, yielding 21,660 short tons of fish meal and 3,222 long tons of fish body oil. (South African Shipping News and Fishing Industry Review, May 1966.)

FISHERY TRENDS, APRIL 1966:

Fish Meal and Fish Oil: South African catches during April reflected a slight improvement over those for the previous month. At Walvis Bay most of the factories operated on a larger scale than originally intended in order to assist in meeting the industry's commitments for fish meal and fish oil. As a result, the supply position was considerably improved. The declining tendency in international fish meal prices continued, owing largely to the Peruvian industry maintaining production at a record level; this trend, however, was not discernible for fish oil, as prices remained firm at the high levels previously attained.

The industry was fully committed for its entire fish oil production for the current year. Fish meal selling also ceased, pending a review later in the year when the actual results for the season become known.

Spiny Lobster: The market for spiny lobster tails was maintained during April but without the buoyancy experienced during the latter months of 1965. Further shipments

South Africa (Contd.):

were nevertheless made to the United States and France; these were sold readily without any price adjustment.

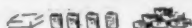
The lobster industry was in the process of accumulating sufficient stocks to permit the continuation of regular monthly shipments throughout the closed season, which this year has been altered to cover the period June to September.

Canned Fish: In his report to the 21st annual general meeting of the Fisheries Development Corporation Limited on March 16, the chairman stated that the domestic consumption of canned fish during the first nine months of 1965 had increased 44 percent over the same period in 1964. A total of 982,662 cases was sold in South Africa during the nine months, which indicates an annual consumption of over one million cases. Increased consumption can be ascribed to the fact that the income of the urban Bantu worker has risen and, whereas the prices of other protein foods have increased, the price of canned fish has remained stable. Efforts will be directed towards the encouragement of local sales.

Shrimp and Tuna: The Fisheries Development Corporation Limited with the Division of Sea Fisheries and aided by Cape Town trawling concerns has, in the past financial year, continued to investigate the location and extent of shrimp grounds. The Natal coast, the Western edge of the Agulhas Bank, and the Northern area of the South West African coast are, according to their reports, definite breeding areas of these crustaceans.

With regard to tuna fishing, however, the Corporation's experiments have not borne fruit. There has yet been no opportunity to use the imported "gill-net" which has proved to be so successful off the Australian coast. Nevertheless, supplies of fish bait were being conserved for the pole-and-line fishing, which promises to have most success locally.

Other Developments: More than 20 contracts totaling about US\$4.5 million were awarded during 1965 for the construction and maintenance of fishing harbors, while the value of the work completed during the period amounted to about \$1.2 million. (*Barclays Trade Review*, Johannesburg, May 1966.)



South-West Africa

FISHERY DEVELOPMENTS, APRIL 1966:

After a short holiday during the Easter period, all processing factories were again operating at full capacity during April. Indications were that the existing quotas for pilchards in the case of Luderitz and Walvis Bay, of 90,000 tons each, would be attained by August; there was no indication that any increase would be granted.

Production and exports of fish meal and other marine products through Luderitz during March 1966 were:

Product	Quantity	Value
	Lbs.	US\$
Fish and lobster meal	784,000	38,580
Spiny lobster tails, frozen	462,220	863,475
Spiny lobster, canned	8,250	9,200

(*Barclays Trade Review*, Johannesburg, May 1966.)



Taiwan

FISH CULTURE

DEVELOPMENT PROGRAM:

The Rockefeller Foundation has approved a grant of US\$150,000 to finance a 2-year fish culture development program in Taiwan. Implementation of the project will start July 1, 1966. The project will be executed by the Taiwan Fish Culture Research Institute and will cover a brackish-water fish culture study, particularly for milkfish and shrimp. Research on oyster culture and development of techniques for mass culture of phytoplankton for food in fish and shellfish culture programs will also be made. (*Taiwan Industrial Panorama*, May 31, 1966.)

FISHERY DEVELOPMENT PLANS:

The Government of the Republic of China is developing plans to expand the country's commercial fisheries, according to the Taiwan Fisheries Bureau. Among the plans are the following fishing operations: stern-trawling in the Atlantic and Southwest Pacific Oceans; shrimp trawling along the northeast coast of South America; and tuna long-lining in the Indian Ocean.



U.S.S.R.

WILL EXPAND FISHING OFF NORTH-AMERICAN COAST IN PACIFIC OCEAN:

Following a 7 months' exploratory cruise in the Pacific Ocean of the refrigerator-trawler Orlan, the Soviet Union announced that the vessel had discovered off the North American coast new fishing grounds for anchovy, sardines, mackerel, and other important food fish. As a result, plans are being made to send fishing fleets to exploit the new grounds in order to produce additional thousands of tons of fish.

* * * * *

DEVELOP SEMIAUTOMATIC CRAB PRODUCTION LINE:

The Soviet Union is reported to have developed a semiautomatic continuous crab production line for use aboard its crab factoryships. Several of the lines were reported to be undergoing tests aboard the vessels. The new lines are expected to replace large numbers of skilled workers now processing crabs manually.



United Kingdom

WHITE FISH AUTHORITY ANNUAL REPORT FOR 1965/66:

The British White Fish Authority's Annual Report for the year ending March 31, 1966, was summarized in the following news release issued by the Authority, June 29, 1966:

Summary: Assuring future supplies of fish was the main theme of the Authority's work during the year.

The Authority has encouraged the growth in freezing the catch at sea. As of mid-1966, Britain had 17 freezer-trawlers in operation, with a dozen more in prospect. The fish they produce is making a significant contribution to the British market and offsetting falling supplies from some traditional grounds where there are warning signs of overfishing.

With the same objective, the Authority, in collaboration with the Fisheries Laboratories and Torry Research Station, initiated exploratory fishing for hake in the South Atlantic,



Fig. 1 - Britain's first conventional distant-water freezer-trawler Ross Fighter. As of mid-1966, Britain had 17 freezer-trawlers fishing.

and an investigation of the techniques at sea and on shore needed to use them to the best advantage.

Insuring against depletion of natural stocks is also the objective behind the Authority's marine fish-farming program.

Marketing activities related to the policy of assuring future supplies include the development of new products from underutilized species such as coley and ocean perch, and promoting the consumption of such fish in institutions. Marketing work is also being done to improve fish packaging.



Fig. 2 - Fish frozen at sea in blocks of 100 pounds are thawed out in a thawing plant at Grimsby prior to filleting.

In regard to grants for new trawlers, economic circumstances delayed the planning of future assistance, and it was not until March 1966 that the Authority was able to resume approval of grants for new trawlers. The existing form of assistance will in due course be replaced by special investment grants, although arrangements will probably be made to ensure against overbuilding. It is hoped that the new system will be a continuing one, so that owners may plan investments more consistently.

United Kingdom (Contd.):

The Authority welcomed Ministers' acceptance of the principle of a statutory minimum prices scheme, to which much thought and work were given during the year. There is, however, no promise of Treasury support at present.

Loans to the Industry: Although the prohibition of loans to large companies remained, loans during the year amounted to £697,000 (US\$1.95 million), including £569,000 (\$1.6 million) for vessels and £128,000 (\$358,000) for processing plants. It was not possible, however, to approve a number of applications from the inshore industry because of financial stringency. Repayments amounted to £2 million (\$5.6 million) and the total balance outstanding at the end of the year fell to £17.7 million (\$49.6 million).

New Construction: Owing to the prolonged examination of the future of the Grants Scheme, funds available were inadequate to meet applications from both the trawling and inshore sections, and additional funds were provided too late to affect approvals in the year ending March 31, 1966.

Only one grant was approved for a freezer-trawler during the year, but two have been approved since. A grant was also approved for a middle-water trawler, subsequently reclassified as a distant-water vessel. These grants amounted to £156,000 (\$436,800).

On inshore side, funds allowed approvals of only 41 grants out of 100 applications for new vessels. For new engines (although priority is given to this class of application), it was also necessary to be selective, and out of 50 applications only 30 were approved. Commitments for the inshore section totaled £227,000 (\$635,600) in grants and £343,000 (\$960,400) in loans.

The future of financial assistance for new building and improvements is bound up with the policy for investment incentives. It has been announced that, subject to Parliamentary approval, the rate of grant will be 35 percent for vessels of 80 feet and over and 40 percent for vessels of under 80 feet. The terms for the new grants have yet to be decided.

Supplies and Values: Total supplies of fresh and frozen white fish in 1965 rose by

8 percent to 900,000 metric tons, the highest figure since 1953, and their value by 9 percent to £74.5 million (\$208.6 million). Landings by British vessels rose from 719,215 tons in 1964 to 786,161 tons in 1965. If pelagic species are excluded, average values remained almost stationary, and margins were accordingly squeezed by increasing costs.

Although distant-water landings rose by 4 percent, and their total value by 5 percent, the proportion of these landings to the total supply declined slightly. Near- and middle-water landings fell slightly, and the main improvement in supply was due to a rise in inshore catches. Scottish supplies from near-, middle-, and inshore-waters rose by 24 percent by weight, but owing to heavy landings of sprat, total value went up by only 9 percent. Inshore catches for the United Kingdom now account for nearly a third of total supplies. The value of shellfish catches remained steady at just under £3 million (\$8.4 million).

Minimum Price Scheme and Quality Control: Consultations with Parliament Ministers continued throughout the year on the justification for a statutory minimum-price scheme, and the possibility of Government financial assistance towards its operation. In March 1966, it was stated that the Government accepted the principle of a statutory scheme and would consider a scheme on its merits and in the light of international obligations, should one in due course be submitted. The Government was not able, however, to promise any financial contribution towards its cost.

Consultations with the industry are taking place on a redrafted minimum price scheme. This, broadly, would empower the Authority to fix minimum prices in relation to species, and to ports, and areas of the coast. Guaranteed payments at levels somewhat below the minimum would be made for fish of good marketable quality which failed to find a buyer. These payments would be financed from a levy, at variable rates, upon different classes of landings. When consultations are completed, the Authority will decide whether to proceed with the scheme and submit it for confirmation.

A minimum-price scheme requires a measure of quality control to ensure that only fish of an accepted standard qualifies for guaranteed payments. At first control is proposed only for distant-water fish, but

United Kingdom (Contd.):

would eventually be extended to all major ports.

Assistance to Inshore Fishermen: Two new cooperatives, at Brixham and at Kilkeel, Northern Ireland, received grants towards formation expenses. A loan was approved for the Kilkeel Association, and the Brixham Association received a loan towards the cost of a flake ice plant. The formation and equipment of inshore cooperatives is a field where the Authority would welcome a greater opportunity of giving financial assistance.

The Committee for Scotland and Northern Ireland continued their program of developing shellfish catches, and are maintaining close cooperation with the newly formed Highlands and Islands Development Board of fishery matters.

Market Promotion: The hopes that the Authority would be in a position to take initial steps towards carrying out a more extensive promotion campaign were not realized due to budgeting problems. The annual appropriation for market promotion remained at £75,000 (\$210,000), and as in the previous year was devoted to laying a firm foundation for a wider campaign when that becomes feasible. The Fish Information Service continued to provide material to help housewives and caterers. The advisory service on shop improvement and the display service secured increasing use by fish retailers. It is felt that the limited funds are spent to good advantage.

Research and Development: Expenditure on research and development projects during the year was £374,000 (\$1,047,200).

OBJECTIVES AND WORK OF THE INDUSTRIAL DEVELOPMENT UNIT: The Unit's objectives are to increase economic efficiency by reducing vessel operating costs, increasing time spent on the fishing grounds, and by improving rates of catch, while maintaining or improving the quality of the landings.

Costs may be reduced by ensuring that the technical specification of a vessel is no more than adequate in relation to the performance required and by determining optimum choices of speed, sizes of hold and processing plant, and other characteristics

for a given fishery. The Unit therefore devotes much time to measuring powers, speeds, and characteristics of vessels and machinery in service to provide a reliable basis for design and for new equipment. Trials were carried out during the year in vessels of different types on such problems as type of trawl, hydraulic transmission for winches, tension meters, and performance of propellers. To obtain satisfactory results, the Unit evolved some advanced techniques of measurement.

Progress was made in the development of a stabilized narrow-beam vertical echosounder; on equipment for telemetering information from a bottom trawl to the ship; and in conjunction with the Marine Laboratory at Aberdeen, on the assessment of a high-performance television camera for observing trawls in action. Tests were carried out on a new disc-and-pad design of trawl-winch brake.

A number of trials were connected with handling and processing on board. Full-scale trials of boxing fish at sea demonstrated that there were resulting advantages in improved quality, reduced weight loss and landing costs, and improved fillet yields. For some time these advantages failed to secure any significant premium in the price paid—a necessity to compensate for higher costs. Trials on a method of superchilling the early part of the catch, in boxes, confirmed that extensions of voyages of at least three or four days would be possible without loss of quality. Work on these developments is continuing.

Another successful experiment was the transfer at sea of fish in boxes from one trawler to another; the two vessels used in the test were made fast, side by side, in a Force 5 wind through the use of special inflatable rubber fenders. Paper studies were made to throw light on the economic advantage of fleeting or mothership operations.

NEW FISHING GROUNDS: The potentialities of the fishing grounds in the South Atlantic were explored to determine whether investment in this fishery would be worthwhile. The survey ship *Hecla* carried out an echo-survey off South-West Africa, and British observers made observations and experiments during voyages of commercial trawlers of other nations. Sufficient infor-

United Kingdom (Contd.):

mation was gathered to permit a decision on whether to carry out further explorations.

NEW PRODUCTS AND PROCESSES: A dozen new products, including various types of sausage and crisps, have been developed to make possible use of species which, though easy to catch, are otherwise discarded or bring an uneconomical price. Some of them have been introduced to manufacturers. Preliminary trials have taken place on the pre-packaging of wet or thawed fish for retail sale. Acceptability trials of ocean perch were held in factory and school lunch rooms.

FUTURE RESOURCES: The Authority's hatchery at Port Erin, established in 1964, produced last year some 400,000 plaice and a few thousand soles. Some 250,000 plaice were used for stocking the experimental sea-lock enclosure at Ardtoe, Argyll, in August 1965, but because of the excessive inflow of fresh water following heavy rainfall and because of the attacks of shore crabs and eels, only a few hundred fish now survive. Vigorous measures have been taken to overcome these difficulties and hazards.

With the cooperation of electricity authorities, preliminary experiments began in 1966 on the rearing of fish in warm water condense outfalls of two power stations (Carmarthen Bay and Hunsterston). Larger facilities to investigate the feasibility of rearing fish to marketable size are being designed.

The Authority's pilot-scale oyster hatchery at Conway was completed in time to make the first trials in August 1965. After initial setbacks, an unbroken series of successful broods was experienced in January-March 1966.

INSHORE VESSELS: Although the Scottish Committee is still awaiting the final report on the research into fungal attacks on wooden fishing vessels, the fungus has been identified, and measures introduced for the treatment of timbers should prevent repetition of outbreaks.

ECONOMIC RESEARCH: A Fisheries Economic Research Unit was established by the Authority in Hull in September 1965, but delays in recruiting professional economists have slowed the work of this Unit.

The Unit's work is in two main channels: (1) studies necessary for day-to-day policies, and (2) development of a research program into production and distribution. This includes studies of the sale of wet fish in super-markets and of the buying practices of institutions; planning has begun on surveys of the economic situation of coastal wholesalers and the catering market.

The Unit also supervises associated research projects commissioned from universities. A study by the University of Oxford of the components of the demand for fish and a forecast of its development up to 1975 are well advanced. The University of Hull is studying the productivity of labor in the deep-water section of the industry, and likely developments of wages and manpower supply, again up to 1975. A contract with a university for a study of inland wholesale markets is under consideration.

The essential purpose of the economic research program is an appraisal of the future development of the industry, of its place in the national economy, and its relation to fishing industries in other countries.

Administration: With increased landings, the Authority's income from the general levy rose to £587,000 (\$1,643,600), and provided a surplus of £82,000 (\$229,600). However, with growing commitments on research and a probable fall in levy receipts, a deficit is estimated for the current year, although the effects will be cushioned by the accumulated surplus which stood at £340,000 (\$952,000) at the end of the year.

Training: A small increase in the appropriation for maintenance grants to fishermen and new entrants taking training courses brought training expenditures for the year to £49,500 (\$138,600); 904 fishermen and boys received grants.

The Authority welcomed the Minister of Labor's announcement that he intended to set up an Industrial Training Board for the fishing industry, and informal discussions have taken place with the Department and sections of the industry, mainly upon the scope of its jurisdiction. The Authority would prefer a Board whose activities covered all sections, but a decision has yet to be taken on the issue.

United Kingdom (Contd.):

Conclusion: In the concluding section of the Report, the Authority set out their views on the need to maintain a strong British fishing industry. Supplies of fish are likely to become of increasing significance both to the world and to this country. The British fleet, which is comparable with the best in efficiency and whose catch ranks twelfth among the nations, should be maintained so that this country has a strong voice in the framing of international regulations and, since it is essential that sensible conservation measures will eventually be adopted, a fair share of supplies.

The maintenance of a strong industry is a more important objective than the Fleck Committee's target of self reliance by 1972. It is necessary to plan the fishing industry's part in the country's primary food production. Long-term planning for the fisherman is at least as necessary as for the farmer, but in fact he has little guidance.

The Authority must play a considerable part in determining the future shape of the fleets, and, if a statutory minimum prices scheme is introduced, a more positive role in marketing. However, the processes open to the Authority for formulating schemes are slow in operation and uncertain in outcome so that the scope for action is limited. The proper exploitation of resources and the provision of adequate supplies of British-caught fish require from Government a more positive attitude towards the industry and perhaps fresh thought about the powers necessary to a strong public body which can help formulate and carry out long-term policy.



Foreign Fishing Off United States Coasts ^{1/}, July 1966

IN NORTHWEST ATLANTIC:

U.S.S.R.: Dense fog blanketed the Georges Bank area during the greater part of July and restricted aerial observations. Only a limited assessment of Soviet fishing activity was possible. The estimated number of Soviet fishing vessels decreased from 150 units early in July to about 125 by month's end due to increased Soviet fishing activity off Nova Scotia.

^{1/}Based on information from surveillance flights by U.S. Bureau of Commercial Fisheries management agents with U.S. Coast Guard cooperation, plus information obtained from other sources.

A total of 105 vessels (exclusive of duplication) were sighted during the month and identified as 23 factory stern trawlers, 6 freezer stern trawlers, 8 large refrigerated side trawlers, 16 medium refrigerated side trawlers, 43 medium side trawlers, 4 refrigerated fish transports, 4 factory base ships, and one seiner-type vessel which was not rigged for fishing. This compares to 161 vessels sighted during June 1966. During July 1965 there was a complete withdrawal of Soviet vessels from Georges Bank to eastern Nova Scotia areas.

The fleet operated in two areas of Georges Bank. Fifty or more vessels (mostly side trawlers and processing ships) fished a 40-mile area in the southwest part of Georges Bank in depths of 50 to 75 fathoms. The principal species of fish taken by this group appeared to be whiting with some evidence of red hake and herring catches.

Another 50 vessels (stern trawlers, side trawlers and fish transports) were scattered over a 40-mile area in the southeast part of Georges Bank. The heavy to moderate catches of fish appeared to be primarily herring. The fish were covered with canvas used to protect it from sun and heat. This made complete identification of the species more difficult. The Soviets were probably increasing effort in harvesting herring in 1966. Their herring catches on Georges Bank dropped sharply in 1965 because of a decline in consumer demand for this species.

A small number of stern trawlers fished intermittently in the vicinity of Cultivator Shoals 80 miles east of Cape Cod. The fish visible on deck appeared to be haddock. Crews were observed culling and dressing the fish. U.S. fishermen have reported abundance of haddock in that area.

Poland: Four Polish factory stern trawlers were sighted in the Georges Bank area. Their catches of fish appeared to be herring and whiting. Five similar vessels were sighted on Georges Bank during September 1965.

Romania: One Romanian factory stern trawler was sighted among the Soviet fleet on the southeast part of Georges Bank. Two such vessels were observed on Georges Bank in 1965.

* * * * *

OFF MID-ATLANTIC COAST:

U.S.S.R.: No vessels of the Soviet fishing fleet were sighted off the U. S. mid-Atlantic coast during July. Soviet fishing vessels were last observed in this area in May 1966 and moved north to fish in the vicinity of Georges Bank off New England.

IN THE GULF OF MEXICO AND CARIBBEAN SEA:

Cuba: No Cuban vessels were reported fishing close to U. S. coasts in the Gulf of Mexico during July. Although 13 fishing craft were identified as Cuban, these vessels were engaged in fishing close to the Cuban coast.

U.S.S.R.: No Soviet fishing vessels were reported active close to U. S. shores in the Gulf area in July. Although not confirmed by reports received during the month, it is believed possible that about 12 Soviet fishing vessels reported in June are still active in the general area of Campeche Banks off the Yucatan Peninsula, Mexico.

OFF PACIFIC NORTHWEST (Washington and Oregon States):

U.S.S.R.: Throughout July 1966, a Soviet fishing fleet operated off the Washington coast primarily for Pacific hake. This fleet, consisting of stern trawlers, side trawlers, and support vessels, moved up and down the coast working on the heaviest concentrations. Upon leaving an area, at least one scout vessel was left behind to check on the abundance of fish. When the fish schooled again in the area, a portion of the fleet would return. Previously, the fleet had concentrated on Pacific ocean perch and other rockfish, but beginning in June, hake was the principal species fished.

At no time was a Soviet vessel observed within United States territorial waters nor were any vessels seen gill-netting salmon. The greatest number of Soviet vessels sighted off the Pacific Northwest coast was on July 7, when Bureau of Commercial Fisheries agents counted 109 Soviet vessels off the Washington coast. On July 20, 94 vessels were sighted in the area, but by the end of the month the fleet was back up to 106 units.

OFF ALASKA:

U.S.S.R.: Fishing effort in the Gulf of Alaska during July was reduced to about 50 vessels, half as many as in June and the lowest level since the winter of 1963-64. This resulted from the transfer of the perch fleets to off the coasts of British Columbia, Washington, and Oregon. Only a few factory trawlers and one freezer trawler conducted perch operations in the Gulf during July. A small fleet of trawlers fished for perch along the central and western Aleutians.

The three Soviet king crab fleets, composed of three factoryships and about eleven tangle net-setting trawlers, terminated operations on the Bristol Bay flats by mid-month.

One of the three Soviet whaling fleets operating in the North Pacific was reported in the western Aleutians. The remaining two fleets conducted operations in the eastern and central North Pacific.

Japan: At the end of July, about 200 Japanese fishing and support vessels were operating in waters off Alaska (around the same number as at the end of June). The high-seas salmon mothership fleet ended operations on July 12 and returned to Japan.

About 20 Japanese vessels (factoryships and trawlers) continued fishing for ocean perch in the central and western Gulf of Alaska. One fleet of 3 vessels, operating in this fishery in June, had left.

Four Japanese fish meal factoryships with about 100 trawlers continued operations in the eastern and central Bering Sea.

In the shrimp fishery, one small factoryship and about 15 trawlers continued fishing north of the Pribilof Islands. Two other trawlers continued shrimp fishing in the area of the Shumagin Islands.

Two king crab factoryships accompanied by 10 catcher boats continued fishing throughout the month on the Bristol Bay flats.

As at the end of June, 3 whaling factoryships and their 30 killer boats were spread from the western Gulf of Alaska to the far Aleutian chain.

In late July, when it appeared that the pink salmon catch in the Cook Inlet area would

exceed the capacity of the area's canneries, the Governor of Alaska invited the Japanese to purchase the surplus fish. As a result,

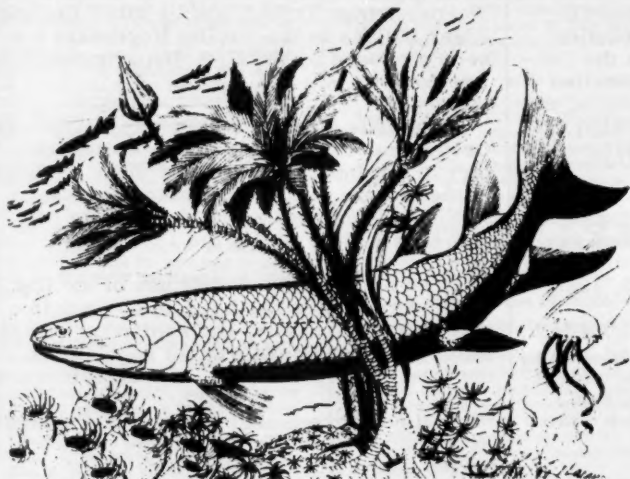
five Japanese stern trawlers, already operating in the Gulf, were dispatched to Cook Inlet to buy and freeze salmon.



MAN MAY OWE HEARING TO ANCIENT FISH

Man may be indebted to a 350-million-year-old fish for his ability to hear today. Some members of an ancient family of fish, called Eusthenopteron, had an air-filled "spiracular pouch" or sac in their heads which was very similar to man's middle ear, said a scientist of the Bell Telephone Laboratories. These fish also must have had an outer eardrum, the

scientist reported to the Acoustical Society of America meeting in Boston. From estimates of the size of the eardrum and the air sac, he calculated that the fish would have heard sounds not only through the water but also through the air.



An artist's concept of a fish and its environment that lived some 350 million years ago. It is theorized that man's hearing mechanism may have evolved from this species or its family.

Hearing capability of a very primitive sort first appeared in early fish as a system of sensory cells of the sides and head that responded to water motions. As fish evolved, they developed a swim bladder, which was essentially a trapped air bubble changing volume under the influence of pressure waves. This probably functioned originally as a buoy or aid in respiration, obeying the gas laws and changing volume when pressure changed, but incapable of locating any source of sound

waves. However, this swim bladder was close enough to affect an "inner ear" labyrinth located deep inside the fish's skull.

The swim bladder and the extensions it later developed could be considered a middle ear and the labyrinth an inner ear, the scientist said. His studies on primitive hearing organs of the ancient fish will provide insight into the hearing capabilities of higher animals including man. (Reprinted, with permission from Science News, weekly summary of current science, copyright 1966 by Science Service, Inc.)



FEDERAL ACTIONS



Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Erhard Frank Griffin, 19 Buchanan St., South Portland, Maine 04106, construction of a new 30-foot vessel to engage in the fishery for lobsters. Notice of the application was published by the U. S. Department of the Interior's Bureau of Commercial Fisheries in the Federal Register, July 30, 1966.

Donald Claude Gillham, 511 Southwest Fall St., Newport, Oreg. 97365, purchase of a used 36.8 foot registered length wood vessel to engage in the fishery for salmon and albacore. Notice published August 2, 1966.

Earl L. Landry, P. O. Box 842, G. Caillou, Houma, La. 70360, purchase of a used 35.1-foot registered length wood vessel to engage in the fisheries for shrimp, oysters, sea trout, drum, sheepshead, and flounder. Notice published August 9, 1966.

Vernon Leo Jamison, 802 Fifth Street, Anacortes, Wash. 98221, purchase of a used 44.4-foot registered length wood vessel to engage in the fisheries for halibut, salmon, crab, albacore, and bottomfish. Notice published August 13, 1966.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund

Procedures--50 CFR Part 250, as revised August 11, 1965).

Note: See Commercial Fisheries Review, August 1966 p. 82.

BUREAU OF INDIAN AFFAIRS

NEW REGULATIONS GOVERNING USE OF NORTHWEST INDIAN FISHING SITES PROPOSED:

A proposal to adopt new regulations governing the use of Indian government-owned fishing grounds by the Yakima, Umatilla, and Warm Springs Tribes, and by other Columbia River Indians in the Pacific Northwest has been proposed by the U. S. Department of the Interior.

The lands affected are in Washington and Oregon, under the jurisdiction of the Secretary of the Interior, and were made available to the Indians in lieu of fishing grounds flooded or destroyed when Bonneville Dam was constructed during the 1930's.

Need for rules to clarify use of the five replacement sites has become obvious in view of health, safety, and sanitation hazards which have developed without regulations, the Interior Department said. The sites are:

1. Lone Pine--on south bank of Columbia River between The Dalles bridge and The Dalles dam. Nine acres in size.
2. Cascade Locks--on south bank of Columbia within city limits of Cascade Locks a few hundred feet downstream from site of the old canal locks. 1.6 acres.
3. Wind River--on east bank of the Wind River about three-quarters of a mile upstream from the Columbia and about 6 miles east of Stevenson, Wash. 19.06 acres.
4. Little White Salmon (also known as Cook site)--on north bank of the Columbia adjacent to Cook, Wash. 3.14 acres.

5. Big White Salmon (also known as Underwood)--on west bank of Big White Salmon River where it enters Columbia, just east of Underwood, Wash. 4.19 acres.

The proposed regulations provide that fishing from the sites on the Columbia River is restricted to enrolled member of the Yakima, Umatilla, and Warm Springs Tribes and other Columbia River Indians having treaty fishing rights at locations destroyed by construction of Bonneville Dam. The same re-

striction applies to the use of camping areas at the sites.

Interested persons were given the opportunity to submit written comments, suggestions, or objections on the proposed regulations.

A Notice of Proposed Rule Making as published in the Federal Register of July 1, 1966, follows:

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

[25 CFR Part 255]

USE OF COLUMBIA RIVER INDIAN IN-LIEU FISHING SITES

Notice of Proposed Rule Making

Basis and purpose. Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by the Revised Statutes, sections 161 (5 U.S.C. 22), and 463 and 465 (25 U.S.C. 2 and 9) and pursuant to other authorizing Acts, it is proposed to add a new Part 255 to Chapter I, Title 25 of the Code of Federal Regulations, to prescribe rules governing the use of lands and facilities acquired by the Secretary of the Army and transferred to the Secretary of the Interior pursuant to the Act of March 2, 1945 (59 Stat. 10, 22) as amended by the Act of June 8, 1955 (69 Stat. 85), to replace Indian fishing grounds submerged or destroyed as a result of the construction of the Bonneville Dam.

The purposes of these regulations are (1) to set forth the qualifications for use of the sites and to provide for identification of eligible users, (2) to limit the purposes for which the sites may be used, and (3) to specify the manner of using the sites.

It is the policy of the Department of the Interior, whenever practicable, to afford the public an opportunity to participate in the rule making process. Accordingly, interested persons may submit written comments, suggestions, or objections with respect to the proposed regulation to the Bureau of Indian Affairs, Washington, D.C. 20240, within 30 days of the date of publication of this notice in the FEDERAL REGISTER.

The proposed Part 255 is as follows:

Sec.	
255.1	Fishing sites subject to regulation.
255.2	Persons eligible to use sites.
255.3	Identification of eligible users.
255.4	Applicability of fishing laws and regulations.
255.5	Applicability of State laws.
255.6	Damage to Government-owned property.
255.7	Unauthorized structures.
255.8	Liability for condition and use of fishing platforms.
255.9	No property on sites to be left unattended.
255.10	Camping and use restrictions.
255.11	Firearms and explosives prohibited.
255.12	No commercial purchase of fish.
255.13	Gambling prohibited.

AUTHORITY: The provisions of this Part 255 issued under 5 U.S.C. 22; 25 U.S.C. 2, 9.

§ 255.1 Fishing sites subject to regulation.

Use of any of the lands acquired by the Secretary of War and transferred to the Secretary of the Interior pursuant to the Act of March 2, 1945 (59 Stat. 22), as amended (hereinafter called "in lieu fishing sites" or "sites") to replace Indian fishing grounds submerged or destroyed as a result of the construction of the Bonneville Dam shall be subject to the following rules and regulations. The Area Director, Portland Area Office, Bureau of Indian Affairs (hereinafter called "Area Director"), may suspend or withdraw the privileges of access to or use of any or all the sites for any violation of the regulations in this part or of any rules issued pursuant to the regulations in this part.

§ 255.2 Persons eligible to use sites.

The in-lieu fishing sites are for the benefit of the Yakima, Umatilla, and Warm Springs Indian Tribes, and other Columbia River Indians having treaty fishing rights at locations inundated or destroyed by Bonneville Dam, to be used in accordance with treaty rights. Fishing from the sites is restricted to enrolled members of any of the aforementioned tribes or groups, and the use of camping areas on the sites is restricted to such Indians and their families.

§ 255.3 Identification of eligible users.

For the purpose of identification of the persons entitled to use the sites for fishing, each member of the aforementioned tribes or groups shall have in his possession an identification card issued by his tribe or the Area Director, identifying him as a member of that tribe or group of Indians, and shall exhibit the identification upon request of authorized persons.

§ 255.4 Applicability of fishing laws and regulations.

No such Indian shall use any of the sites for fishing or for any activity directly associated with fishing that is contrary to the provisions of any law or regulation of his tribe or to any fishing regulations that may be prescribed by the Secretary of the Interior.

§ 255.5 Applicability of State laws.

State law and local ordinances now existing, or hereafter enacted, which do not interfere with treaty fishing rights or with applicable Federal law apply to and on the sites. Violation of such State or local laws shall be grounds for suspension or withdrawal of privileges for future access to or use of the sites.

§ 255.6 Damage to Government-owned property.

Anyone committing any act of depredation, destruction, theft, or misuse of the land, buildings, fences, signs, or other structures which are the property of the United States shall be subject to prosecution under applicable Federal or State law.

§ 255.7 Unauthorized structures.

No structures shall be erected or placed upon the sites without prior approval of the Area Director or his designee. Any structure erected in violation of these regulations may be removed, demolished, or otherwise disposed of with or without prior notice, as determined by the Area Director, and the cost of such disposition may be assessed against the person responsible for the structure.

§ 255.8 Liability for condition and use of fishing platforms.

(a) Any fishing platforms or other private structures erected or placed on the sites are the sole responsibility of their owners, and all use of such structures shall be at the user's or owner's sole responsibility and risk. Neither the United States nor any officer or employee thereof warrants, makes any representation, or is responsible for the safety or condition of any such structure.

(b) The approval required by the regulations in this part for the erection or placement of said structures is solely for the protection of the sites and for the prevention of unauthorized use of the sites or any portion thereof. Any use or occupancy of any such platforms without the authority or permission of the owner shall be a trespass.

§ 255.9 No property on sites to be left unattended.

No vehicle, trailer, boat, or other personal property shall be placed or left unattended on the sites except as may be authorized by the Area Director. Property left in violation of these regulations may be removed without prior notice to the owner and may be stored or otherwise disposed of at the owner's expense as determined by the Area Director.

§ 255.10 Camping and use restrictions.

All camping, picnicking, use of alcoholic beverages, setting or use of fires and use of the sites for cleaning of fish, and the deposit of any garbage, paper, cans, bottles, or rubbish of any kind shall be subject to such prohibitions, restrictions, or other regulations as the Area

Director may prescribe and cause to be posted on the site or sites to which said regulations are applicable; provided that no fee may be charged to any Indian or member of his family for any such use.

§ 255.11 Firearms and explosives prohibited.

No firearms or explosives of any kind may be brought onto the sites except by authorized law enforcement personnel.

§ 255.12 No commercial purchase of fish.

No person, firm, or corporation shall engage in the commercial purchase of fish on the sites except as may be expressly authorized by the Area Director.

§ 255.13 Gambling prohibited.

Gambling in any form, or the operation of any gambling device on the sites is prohibited.

STEWART L. UDALL,
Secretary of the Interior.

JUNE 24, 1966.



TARIFF COMMISSION

[332-49]

CANNED CLAMS AND CERTAIN OTHER PRODUCTS

Investigation of Economic Impact of Concessions on Certain Products Now Subject to Duty on American Selling Price Basis of Valuation

Notice is hereby given that the U.S. Tariff Commission, on the basis of a request made by the Acting Special Representative for Trade Negotiations at the direction of the President, has instituted, pursuant to section 332 of the Tariff Act of 1930 (19 U.S.C. 1332), an investigation with respect to the following products which for duty purposes are now subject to the American selling price basis of valuation:

1. Canned clams: Schedule 1, part 3E, headnote 1; item 114.05.
2. Chemical products: Schedule 4, part 1, headnotes 4 and 5; all items in subparts B and C.
3. Footwear: Schedule 7, part 1A, headnote 3(b); item 700.60.
4. Knit gloves: Schedule 7, part 1C, headnote 4, item 704.55.

A Commission report dated July 25, 1966 (TC Publication 181), contains a schedule of converted rates of duty based on conventional methods of valuation which the Commission determined would have provided substantially the same amount of collected duty in a recent period as the existing rates on the above-described products subject to American-selling-price valuation. The purpose of this investigation is to secure information for use in connection with the preparation of advice to the President as to the probable economic effect

Note: See *Commercial Fisheries Review*, June 1966 p. 108.

U. S. Tariff Commission

HEARING ON IMPORT DUTIES FOR CANNED CLAMS:

A public hearing was scheduled to be held September 7, 1966, by the U. S. Tariff Commission in connection with an investigation on several products, including canned clams, which for import duty purposes are subject to the American selling price basis of valuation. An earlier hearing on the subject was held June 8, 1966.

A Commission report dated July 25, 1966, (TC Publication 181) contained a schedule of converted rates of duty for clams other than razor clams (including clam pastes and sauces but not clam chowder) in airtight containers. Included also are whole clam meats, minced clam meats, smoked whole clam meats, clam sauce, and oriental specialties (seasoned, baked, and broiled clams canned in Japan).

Notice of the hearing was published in the *Federal Register*, August 3, 1966, as follows:

upon the domestic industries producing like or directly competitive articles—

1. Of the elimination of the American-selling-price system of valuation with a concurrent establishment of the above mentioned schedule of converted rates, and

2. Of a reduction of up to 50 percent in such new converted rates.

The Commission's report of such advice to the President will be submitted in confidence no later than October 3, 1966.

Public hearings in connection with the investigation will commence at 10 a.m., e.d.s.t., on Wednesday, September 7, 1966, in the Hearing Room, Tariff Commission Building, 8th and E Streets NW., Washington, D.C. Requests to appear at the hearings must be filed in writing with the Secretary of the Commission on or before September 1, 1966. Such requests must contain the following information:

a. The item number or numbers in the Tariff Schedules of the United States covering the article or articles on which testimony will be presented.

b. The name and organization of the witness or witnesses who will testify, and the name, address, telephone number, and organization of the person filing the request.

c. A statement indicating whether the testimony to be presented will be on behalf of importer or domestic-producer interests.

d. A careful estimate of the aggregate time desired for presentation of oral testimony by all witnesses for whose appearances the request is filed.

Because of the time limit in which the Commission must complete its report, it may be necessary to limit the time for the presentation of oral testimony. Accordingly, in scheduling appearances

at the hearings the time to be allotted to witnesses for the presentation of oral testimony will be limited as circumstances require. Supplemental written statements, consisting of a signed original and nineteen true copies, will be allowed in all cases and should be submitted at the time of presentation of oral testimony.

Persons who have properly filed requests to appear will be individually notified in advance of the date on which they will be scheduled to present oral testimony and of the time allotted for presentation of such testimony.

Questioning of witnesses will be limited to members of the Commission.

Written information and views in lieu of appearance at the public hearings may be submitted by interested persons. A signed original and 19 true copies of such statements shall be submitted. Business data which it is desired shall be treated as confidential shall be submitted on separate sheets, each clearly marked at the top "Business Confidential." All written statements, except for confidential business data, will be made available for inspection by interested persons. To be assured of consideration by the Commission, written statements in lieu of appearance should be submitted at the earliest practicable date, but not later than the date of the closing of the public hearings.

All communications regarding the Commission's investigation should be addressed to the Secretary, U.S. Tariff Commission, Washington, D.C. 20436.

By direction of the U.S. Tariff Commission.

Issued: July 28, 1966.

[SEAL]

DONN N. BENT,
Secretary.



Eighty-Ninth Congress (Second Session)



Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

ALEWIFE EXPLOSION-GREAT LAKES: Rep. Zablocki spoke in the House concerning the population explosion of alewives in the Great Lakes and inserted in *Congressional Record*, Aug. 11, 1966 (p. A4253), an editorial published in the *Milwaukee Journal*, titled "Milwaukee--With Lamprey Losing, It's Time to Start on Alewife." Rep. Zablocki stated "For example, in Lake Michigan alone it is estimated that there may be as many as 10 billion alewife." Rep. Zablocki urged that a crash action program be authorized to curb the alewife problem.

COMMODITY PACKAGING AND LABELING: House Committee on Interstate and Foreign Commerce July 26-29, 1966, met to consider H. R. 15440 and related bills, to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling of certain consumer commodities distributed in such commerce.

House Committee on Interstate and Foreign Commerce July 26, 1966, held hearings on H. R. 15440. Senate Committee on Interstate and Foreign Commerce held meeting on the same bill July 27, 1966.

H. R. 16566 (Clevenger), introduced in House July 27, 1966, a bill to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling of certain consumer commodities distributed in such commerce, and for other purposes; to the Committee on Merchant Marine and Fisheries.

House Committee on Interstate and Foreign Commerce continued hearings on H. R. 15440, and related bills, on July 27, 1966.

CONSUMER SUBCOMMITTEE, SENATE COMMITTEE ON COMMERCE: Sen. Magnuson spoke in the Senate (*Congressional Record*, Aug. 12, 1966, p. 18427), and announced the creation of a new standing Consumer Subcommittee of the Committee on Commerce. He stated that legislation directly affecting the rights or interests of consumers, previously considered before the full committee, will be processed by the Consumer Subcommittee. The subcommittee will be chaired by Sen. Magnuson. He stated that in particular, the subcommittee will periodically review the consumer protection activities of such agencies as the Federal Trade Commission, Department of Commerce, and with respect to the Hazardous Substances Act and

the Packaging and Labeling Act, the Food and Drug Administration. Sen. Magnuson said the subcommittee should provide an important forum for the exchange of views on consumer protection with affected industries.

FISHERIES CONFERENCE: Sen. Kennedy (Mass.) spoke in the Senate (*Congressional Record*, Aug. 3, 1966, p. 17231), concerning the United States-U. S. S. R. fisheries conference held in July 1966, which dealt, among other things, with problems involving Soviet fishing fleets fishing off the Atlantic coast of the United States and off the west coast. He stated the Soviets agreed at this meeting not to fish within 12 miles of the Oregon and Washington coast lines, and that they also agreed to a complete exchange of scientific and statistical information in order to determine the exact extent to which depletion of our salmon runs is taking place off our shores. He also stated he intends to recommend that the scientific meeting to be held on this subject some time in fall 1966 be followed by a meeting with the Soviets which would include representatives of the administration, the Congress, and industry so that an understanding can be reached with them which will insure in the future the conservation of fishing resources off the east coast.

FISHERMEN'S PROTECTION ACT REVISION: Sen. Kuchel spoke in the Senate (*Congressional Record*, July 21, 1966, pp. 15785-15786), concerning a four point program which he proposed to insure the protection and preservation of our fishing activities off Latin America. The Senator inserted in the *Record* two letters--one from the Department of State, and one from the American Tuna Boat Association.

FISHING LIMIT OF 12 MILES: Twelve-Mile Fishery Zone: Hearings before the Subcommittee on Merchant Marine and Fisheries of the Committee on Commerce, United States Senate, 89th Congress, 2nd session on S. 2218, a bill to establish a contiguous fishery zone beyond the territorial sea of the United States, May 18, 19, and 20, 1966, Serial No. 89-65, 186 pp., printed. Contains text, agency comments, statements, letters, telegrams, miscellaneous information from various Federal officials, members of Congress, and representatives of various associations.

Rep. Hanner in extension of remarks inserted in *Congressional Record*, July 18, 1966 (pp. A3765-A3768), two documents concerning legislation to provide a 12-mile fishery limit. The first is a letter from Dr. W. M. Chapman, Director of the Division of Research for Van Camp Sea Food Co., and a member of the Governor's Advisory Commission on Ocean Resources for California. The other is a report entitled "Consideration of the Effects of Foreign Fishery Activities Off the State of California: Outline of the Problem," by Dr. M. B. Schaefer, who is a member of the staff of Scripps Institute on Oceanography.

The Subcommittee on Fisheries and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries met in executive session, July 26, 1966, and approved for full committee action H. R. 9531 (amended), to establish a contiguous fisheries zone beyond the territorial sea of the United States.

FISH PROTEIN CONCENTRATE PLANTS: Fish Protein Concentrate: Hearings before the Committee on Commerce, United States Senate, 89th Congress, 2nd session on S. 2720, a bill to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, practicable and economic means for the production by the commercial fishing

industry of fish protein concentrate, Apr. 25, 1966, Aberdeen, Washington, May 16 and 17, 1966, Washington, D. C., Serial No. 89-64, 245 pp., printed. Contents include text, agency reports, statements, letters and telegrams from various Federal officials, members of Congress, and business representatives.

Sen. Hart, on July 27, 1966, presented to the Senate, among others, a resolution from the Great Lakes Commission endorsing S. 2720, the fish protein concentrate bill. The Congress was urged by the Commission to establish one of the demonstration plants in the Great Lakes area.

Rep. Keith spoke in the House (Congressional Record, July 27, 1966, pp. 16438-16439) concerning fish protein concentrate. There was some question on the part of FDA concerning flouride content. Keith stated a number of eminent scientists considered FPC to be perfectly safe.

The Subcommittee on Fisheries and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries August 16 and 17, 1966, held hearings on H. R. 12269, and related bills, to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, practicable and economic means for the production by the commercial fishing industry of fish protein concentrate.

GREAT LAKES POLLUTION: Sen. Hart, on July 27, 1966, presented to the Senate a number of resolutions from the Great Lakes Commission. Included among them was "Resolution of the Pollution Control Committee: Resolution Regarding Alewife Control in the Great Lakes." This requests the Department of the Interior to conduct a survey development action program for the effective control of alewife from the Great Lakes.

INTERIOR NOMINATION: Senate July 21, 1966, in executive Session, confirmed the nomination of Frank C. Di Luzio, of New Mexico, to be an Assistant Secretary of the Interior. Among the duties of the new Assistant Secretary will be the administration of the water pollution control program, which was transferred from the Department of Health, Education, and Welfare under the Federal Water Pollution Control Act to the Department of the Interior.

INTERNATIONAL CONVENTION FOR THE NORTHWEST ATLANTIC FISHERIES: The Committee on Foreign Relations July 15, 1966, reported Ex. I (89th Cong., 2nd Sess.), Protocol to the International Convention for the Northwest Atlantic Fisheries, relating to measure of control, and the Protocol to the International Convention for the Northwest Atlantic Fisheries, relating to the entry into force of proposals adopted by the Commission. (Ex. Rept. No. 7)

Sen. Fulbright inserted in Congressional Record, July 18, 1966, (pp. 15288-15308) excerpts from the record of the Committee on Foreign Relations on the Protocols to the North Atlantic Fisheries Convention of 1949--Executive I (89th Cong., 2nd Session). He stated that these Protocols will be voted upon on July 19.

Senate, July 19, 1966, adopted the resolution of ratification of Protocols Ex. I (89th Cong., 2nd Session) to the Northwest Atlantic Fisheries Convention of 1949. The text of the Protocols and the resolution of ratification are printed in the Record pp. 15376-15378.

JELLYFISH-CONTROL ELIMINATION IN COASTAL WATERS OF U. S.: H. R. 16634 (Downing) Introduced in House July 28, 1966, to provide for the control or elimination of jellyfish and other such pests in the coastal waters of the United States; to Committee on Merchant Marine and Fisheries.

Subcommittee on Fisheries and Wildlife Conservation of House Committee on Merchant Marine and Fisheries Aug. 9, 1966, held a hearing on H. R. 11475, and related bills. Among others, testimony was heard from Donald L. McKernan, Director, Bureau of Commercial Fisheries, Department of the Interior.

Subcommittee on Fisheries and Wildlife Conservation of House Committee on Merchant Marine and Fisheries, Aug. 11, 1966, concluded hearings on H. R. 11475, and related bills, to provide for the control or elimination of jellyfish and other pests in the coastal waters of the United States. Testimony was heard from Rep. Sickles.

MINIMUM WAGE: Senate Committee on Labor and Public Welfare met in executive session July 26-27, 1966, for further consideration of H. R. 13712, to increase minimum wages and to extend such coverage to additional employees, but did not conclude action thereon.

Senate Committee on Labor and Public Welfare, Aug. 10-11, 1966, continued its executive consideration of H. R. 13712, to increase minimum wages and extend such coverage to additional employees, but did not conclude action thereon, and was to meet again on Aug. 16.

MISCELLANEOUS FISHERIES LEGISLATION: Part 1, hearings before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, 89th Congress, 2nd session on Fish and Wildlife Coordination Act H. R. 9492, H. R. 14414, H. R. 14455, H. R. 14975, H. R. 15001, May 11, 13, 1966; Fishing Rights, H. R. 9530, H. R. 9531, H. R. 9540, H. R. 10177, H. R. 13479, H. R. 14961, H. R. 15011, H. R. 15030, H. R. 15191, H. R. 15278, May 24, 25; June 1, 1966, Serial No. 89-24. Contains text, statements, communications from various Federal and state officials, members of Congress, and business representatives.

NATIONAL SEA GRANT COLLEGES AND PROGRAM ACT OF 1965: S. Rept. 1307, Sea Grant Colleges (June 24, 1966, report from the Committee on Labor and Public Welfare, U. S. Senate, 89th Congress, 2nd session, to accompany S. 2432), 19 pp., printed. Committee reported bill favorably with amendments. Discusses background and purpose, section-by-section analysis and changes in existing law.

Subcommittee on Oceanography of House Committee on Merchant Marine and Fisheries July 15, 1966, met in executive session and discussed the pending Sea Grant College legislation.

Introduced in House H. R. 16344 Sickels July 19, 1966, H. R. 16559 (Rep. Rogers of Fla.) July 26 H. R. 16567 (Clevenger) and H. R. 16581 (Murphy of N. Y.) July 27, a bill to authorize a program of Federal assistance to sea grant colleges in order to establish or expand programs in marine sciences, and for other purposes; to the Committee on Merchant Marine and Fisheries.

House Committee on Merchant Marine and Fisheries met in executive session July 27, 1966, and ordered reported favorably to the House H. R. 16559.

The Committee on Merchant Marine and Fisheries Aug. 1, 1966, reported (H. Rept. 1795) H. R. 16559; referred to Committee of the Whole House on the State of the Union.

H. Rept. 1795, Authorizing The Establishment and Operation of Sea Grant Colleges and Programs (Aug. 1, 1966, report from the Committee on Merchant Marine and Fisheries, House of Representatives, 89th Congress, 2nd session, to accompany H. R. 16559), 18 pp., printed. Committee reported bill favorably without amendment. Discusses purpose, need for the legislation, section-by-section analysis, cost, departmental reports, and changes in existing law.

OCEANOGRAPHY: Sen. Bartlett inserted in Congressional Record, July 15, 1966, (pp. 15131-15132), the text of the address of President Johnson on July 13 at the commissioning ceremonies of the U. S. Coast and Geodetic Survey ship Oceanographer.

Rep. Byrne of Pennsylvania (at the request of Mr. Waldie) in extension of remarks (Congressional Record, July 27, 1966, pp. 16453-16454), regarding President Johnson's bid to the Soviet Union to join us and other maritime nations in exploring the ocean depths. He inserted in the Record, "Legacy of All Humanity," an editorial from the Philadelphia Inquirer, July 17, 1966.

Sen. Bartlett spoke in the Senate (Congressional Record, Aug. 1, 1966, pp. 16927-16929) concerning the U. S. Coast and Geodetic Survey vessel Oceanographer, commissioned on July 13. He spoke of the history of the U. S. Coast and Geodetic Survey, emphasizing the role that agency has played for 159 years in providing this Nation, and the world, with basic knowledge of the seas essential for commerce and essential as the scientific foundation on which much of the present surge of oceanographic research will be based.

Sen. Pell inserted in Congressional Record, July 29, 1966 (pp. 16835-16836), an article on oceanography which was published in the July 17, 1966, edition of the New York Times titled "Oceanography: The Profit Potential Is As Big As the Sea--Search Yields Chemicals, Oil--and even Diamonds;" by William D. Smith.

Rep. Case inserted in Congressional Record, Aug. 10, 1966 (pp. A4244-A4245), an article published in the June 1966 issue of Oceanography, titled "United States Oceanographic Efforts Are Expanding and Becoming More Pragmatic--Prospects Are Encouraging For Legislation That Will Give The Field New Emphasis," by Robert B. Abel, executive secretary, Interagency Committee on Oceanology. The article mentioned Congressional interest and activity in oceanography and bills introduced and considered; that they declare national policy in the oceans and outline national objectives for investigation and exploitation of the oceans.

OIL POLLUTION OF THE SEA: Senate Committee on Commerce, July 26, 1966, ordered favorably reported H. R. 8760 to implement the provisions of the international Convention for the Prevention of the Pollution of the Sea by Oil.

PESTICIDES REPORT: (S. Rept. No. 1379) Senator Ribicoff submitted a report entitled "Interagency Environmental Hazards Coordination--Pesticides and Public Policy," which was agreed to July 19, 1966, by the full Committee on Government Operations. The report is based on findings and conclusions of the

Committee after 2 years of hearings on the use of pesticides held by its Subcommittee on Executive Reorganization. The report is an effort to summarize the state of knowledge, analyze the public policy issues, and present a course of further study and action relating to pesticides.

SOVIETS AND THE SEAS: Committee on Merchant Marine and Fisheries Aug. 4, 1966, reported (H. Rept. 1809) on the Soviets and the Seas. The report concerned a trip to the U.S.S.R. by Representatives Keith and Rogers. Referred to the Committee of the Whole House on the State of the Union.

WATER POLLUTION CONTROL ACT: S. Rept. 1367, Federal Water Pollution Control Act Amendments and Clean Rivers Restoration Act of 1966: (July 11, 1966, report from the Committee on Public Works, U. S. Senate, 89th Congress, 2nd session, to accompany S. 2947), 49 pp., printed. Committee reported bill favorably with amendment. Discusses purpose, major provisions of the bill, and changes in existing law.

WATER POLLUTION CONTROL ACT AMENDMENT--VESSEL POLLUTION CONTROL: H. R. 16938 (Kupferman) introduced in House Aug. 9, 1966, to provide that plans and regulations established pursuant to section 10 of the Federal Water Pollution Control Act for the control of water pollution shall apply to vessels (including boats) and marinas; to Committee on Public Works. Rep. Kupferman stated that this bill is similar to S. 3225, which Sen. Tydings introduced in April 1966. He stated that we must not allow boat owners and users and related industries to impede the substantial progress being made in the general area of water pollution control. He stated that this bill will go a long way to reduce the problem of water pollution from these sources.

WATER RESOURCE PROPOSALS--FEASIBILITY INVESTIGATIONS: House July 18, 1966, passed H. R. 13419, to authorize the Secretary of the Interior to engage in feasibility investigations of certain water resource development proposals. This passage was subsequently vacated and S. 3034, a similar bill, was passed in lieu after amending the bill to contain the provisions of H. R. 13419.

House Aug. 1, 1966, insisted on its amendments to S. 3034, agreed to a conference with the Senate; and appointed conferees.

WATER RESOURCES RESEARCH PROGRAM: Sen. Jackson inserted in Congressional Record, Aug. 8, 1966 (p. 17753), a letter from the Office of Science and Technology, transmitting a report entitled "Federal Water Resources Research Program for FY 1967." Earlier this year, President Johnson transmitted a long-range study of the Committee on Water Resources Research entitled "A Ten-Year Program of Federal Water Resources Research." The FY 1967 program reflects the recommendations of that long-range study.

WORLD HUNGER: Senate Committee on Agriculture and Forestry July 15, 1966, continued its executive consideration of H. R. 14929, proposed Food for Freedom Act, but did not conclude action thereon, and will meet again for its further consideration July 20, 1966.

Sen. Dodd spoke in the Senate (Congressional Record, Aug. 8, 1966, pp. 17766-17767), concerning the food for peace program. He stated that the food-for-peace program can be made to work if our Government makes it

abundantly clear that the shipment of U. S. food surpluses abroad will be flatly denied to those nations who fail to take concrete measures aimed at agricultural reform, and increasing agricultural production.

Note: REPORT ON FISHERY ACTIONS IN 89TH CONGRESS. The U. S. Department of Interior's Bureau of Commercial Fisheries has issued a leaflet on

the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL--3 "Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 N. Fort Myer Drive, Rm. 510, Arlington, Va. 22209.



SEAWEED SUPPLIES MAY BECOME LOW

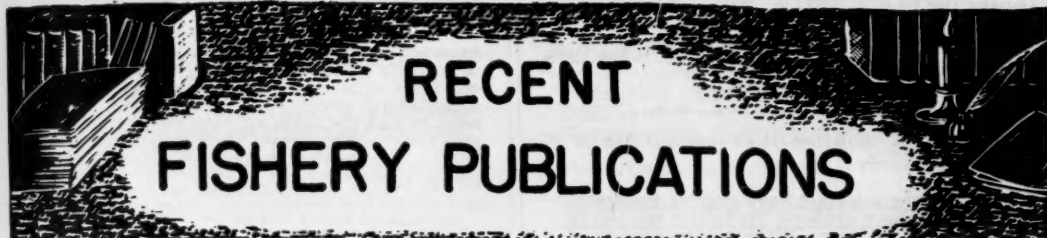
Extracts from seaweeds such as Irish moss, kelp and rockweed find more than 40 different uses in the food, pharmaceutical and textile industries and in agriculture.

Five species of seaweeds are now being harvested commercially in the Canadian Atlantic provinces--dulse, Irish moss, *Ascophyllum*, *Gigartina*, and *Furcellaria*. Dulse is sold for human consumption and the other seaweeds are processed for the production of gelling agents, such as sodium alginate and carrageenan, which find wide use in the food and pharmaceutical industries.

Though man is only beginning to make full use of the ocean as a source of food and other items, Canadian scientists are becoming worried that some of the demands will be too great.

The value of seaweed harvested in the Canadian Maritime Provinces--Nova Scotia, New Brunswick, and Prince Edward Island--is now about one million dollars annually. There is considerable industry based on the collection of widely scattered wild plants. Further industry growth will place additional demands on known beds of commercially-important species. While surveys will probably reveal new sources, it is quite possible that cultivation of selected species of seaweeds will become necessary, according to the scientist in charge of plant physiology at the Canadian National Research Council's Atlantic Regional Laboratory in Halifax. Seaweed cultivation studies have been initiated on a small scale. The work is expected to be expanded with the establishment of a field station. Present research is concerned with the environmental factors controlling growth of different species of seaweeds. Surveys already conducted show that seaweeds grow in Canada's coastal waters, and additional species are likely to be discovered. Although most species of seaweeds grow in the intertidal zone where they are fully or partially exposed at low tide, a considerable number grow well below the surface. It is in deep water that the large weeds are found. *Agarum*, a species of kelp commonly known as the sea colander, has been found growing in extensive beds at a depth of 50 to 60 feet. Although rarely seen, this is an abundant seaweed on the Atlantic coast of Nova Scotia. Little is known about the chemistry of most of the species of seaweed found on the Atlantic coast. Chemical studies continue to reveal new and interesting compounds, some not previously found in nature. Commercial potentialities for these compounds remain to be assessed.

An interesting weed recently discovered by Canadian researchers is a red alga (*Polysiphonia arctica*) that thrives at depths of 100 feet and was not previously found growing in the area. One of the most important gelling agents found in seaweeds is agar. There are no species in the Atlantic region being used for production of agar but the seaweed, *Gracilaria*, which contains a gelling agent similar to agar grows in the warmer waters of the region. (Reprinted, with permission from *Science News*, weekly summary of current science, copyright 1966 by Science Service, Inc.)



RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SSR. - FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

- | Number | Title |
|----------|---|
| CFS-4040 | Fish Meal and Oil, 1965 Annual Summary, 4 pp. |
| CFS-4108 | Michigan, Ohio & Wisconsin Landings, February 1966, 3 pp. |
| CFS-4124 | Virginia Landings, 1965 Annual Summary, 13 pp. |
| CFS-4135 | Virginia Landings, March 1966, 4 pp. |
| CFS-4138 | South Carolina Landings, 1965 Annual Summary, 6 pp. |
| CFS-4141 | Virginia Landings, April 1966, 4 pp. |
| CFS-4144 | Frozen Fishery Products, May 1966, 8 pp. |
| CFS-4153 | Louisiana Landings, April 1966, 3 pp. |
| CFS-4159 | Maryland Landings, 1965 Annual Summary, 12 pp. |
| CFS-4160 | Alabama Landings, 1965 Annual Summary, 6 pp. |
| CFS-4161 | Mississippi Landings, March 1966, 2 pp. |
| CFS-4163 | Rhode Island Landings, February 1966, 3 pp. |
| CFS-4164 | Alabama Landings, April 1966, 3 pp. |
| CFS-4168 | Texas Landings, March 1966, 2 pp. |
| CFS-4169 | Texas Landings, April 1966, 2 pp. |
| CFS-4171 | Maine Landings, April 1966, 4 pp. |
| CFS-4172 | North Carolina Landings, May 1966, 4 pp. |
| CFS-4175 | Gulf Coast Shrimp Data, January 1966, 13 pp. |

Sep. No. 767 - The Industrial Fisheries of Tomorrow--Charting the Course.

Sep. No. 768 - Third Technical Meeting on Fishing Boats.

Sep. No. 769 - Heat Inactivation of Thiaminase in Whole Fish.

Sep. No. 770 - Argentina--Tuna Fisheries, 1960-1964.

FL-581 - List of Fishermen's and Fish Shore Workers' Unions in the United States, 4 pp., June 1966. The

list was originally compiled in February 1948, with the latest revision made in December 1965. It may not be complete because of changes taking place among fishery unions, new unions or branches being formed, or changes in affiliations.

FL-589 - The Shrimp and the Shrimp Fishery of the Southern United States, by William W. Anderson, 8 pp., revised 1966.

SSR-Fish, No. 529 - The Bureau of Commercial Fisheries Type IV Electrofishing Shocker--Its Characteristics and Operation, by Benjamin G. Patten and Charles C. Gillaspie, 18 pp., illus., April 1966.

Annual Report of the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C., for the Fiscal Year Ending June 30, 1965, Circular 240, 43 pp., illus., March 1966. Contains accounts of the work accomplished during FY 1965, including the Laboratory Director's report covering research highlights, and participation in the Atlantic States Marine Fisheries Commission, training programs, and work conferences. Presents information on research programs conducted by the laboratory including blue crab and menhaden; and studies on shad and striped bass under the laboratory's Anadromous Fisheries Program. Also includes summaries of library activities, seminars presented, meetings attended, and publications by staff members.

Commercial Clams of the North American Pacific Coast, by Murray H. Amos, Circular 237, 21 pp., illus., April 1966. Discusses the habitat, anatomic features, reproduction, propagation, harvesting, and the principal species of commercial clams of the Pacific Coast. Also discusses sanitary control and clam fishery regulations.

Report of the Bureau of Commercial Fisheries Biological Station, St. Petersburg Beach, Florida--Fiscal Years 1962-1964, by James E. Sykes, Circular 239, 26 pp., illus., April 1966. Discusses the estuarine research program--the biological, chemical, and physical environment of the estuary, and the conditions that promote the production of commercially valuable organisms. Also discusses the work accomplished by the laboratory on the red tide program. The principal aims of this program are to conduct research leading to an understanding of the combination of hydrological factors that are responsible for the blooms of *G. breve* and to propose and test methods which promise to reduce the lethal effect on marine animals.

THIS ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE FROM THE U. S. BUREAU OF COMMERCIAL FISHERIES, P. O. BOX 3836, HONOLULU, HAWAII 96812.

A Study of the Sounds Produced by Sardines and Tuna, by G. F. Timofeev, AtlantNIRO. (Translated by Alberta Freidus from Russian, Rybnoe Khoziaistvo, vol. 41, July 25-27, 1965, pp. 1-5, illus.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Market News Monthly Summary.

Part I - Fishery Products Production and Market Data, June 1966, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; imported frozen fish and shellfish prices; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary.

Part II - Fishing Information, June 1966, 14 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Gulf Fisheries (Selected Areas) - 1965, by E. J. Barry, 39 pp., illus., July 1966. (Market News Service, U. S. Fish and Wildlife Service, 600 South St., New Orleans, La. 70130.) Summarizes the commercial landings of fish and shellfish for selected areas of the Gulf States of Florida (West Coast), Alabama, Mississippi, Louisiana, and Texas. The tables show landings for only the specific areas designated and cannot be interpreted as representing the total landings for a given State. However, the data do give an indication of general trends. Part I reports on developments and conditions in Gulf Coast fisheries during 1965 and gives a resumé of the individual fisheries. Discusses the shrimp fishery in detail; production and market conditions for the oyster, blue crab, and finfish fisheries; as well as imports of fresh and frozen fish and shellfish. Part II includes statistical tables showing total fishery landings by area; crab-meat production by areas and months; and menhaden landings, and production of fish meal, oil, and solubles. It also gives data on fishery imports through Miami, Fla.; Mobile, Ala.; Port Isabel and Brownsville, Tex.; Morgan City, La.; New Orleans, La. Customs District; and Houston, Tex.; and LCL express shipments from New Orleans for 1965 by months and destination. Also included are tables showing monthly range of wholesale prices of fishery products on the New Orleans French Market; Gulf States oyster and shrimp packs, and fishery products market classification in the Gulf Area.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, June 1966, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes landings by the halibut fleet reported by the Seattle Halibut Exchange; salmon

landings reported by primary receivers; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and nonscheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district for the month indicated.

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The Progressive Fish Culturist, vol. 28, no. 3, July 1966, pp. 123-184, illus., processed, single copy 25 cents. Some of the articles are: "Effect of type of supplemental dietary fat on chinook salmon fingerlings," by Laurie G. Fowler and Edward M. Wood; "Growth of a blue X channel catfish hybrid as compared to its parent species," by John J. Giudice; "Effects of apholate, an insect sterilant, on an estuarine fish, shrimp, and gastropod," by Ronald Eisler; "Production of striped bass fingerlings," by James C. Anderson; "A water recirculation unit for use in fishery laboratories," by Hugh R. McCrimmon and Alfred H. Berst; "A simple apparatus for the incubation of salmonid embryos at controlled levels of temperature, water flow, and dissolved oxygen," by John C. Mason and James L. Fessler; "Design and use of a miniature purse seine," by John R. Hunter, Donald C. Aasted, and Charles T. Mitchell; and "A floating field laboratory for estuarine fish toxicity studies," by Charles D. Ziebell.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALGAE:

"Gas exchange of algae," by Elizabeth C. B. Ammann and Victoria H. Lynch, article, Applied Microbiology, vol. 13, July 1965, pp. 546-551, printed. Applied Microbiology, Williams & Wilkins Co., 428 E. Preston St., Baltimore, Md. 21202.

AMINO ACIDS:

"Free Amino Acids in the Blood of Common Carp (*Cyprinus carpio*)," by Y. Creach and A. Serfaty, article, Chemical Abstracts, vol. 62, Feb. 1, 1965, Abstract No. 3123f, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

ANCHOVY:

Synopsis of Biological Data on Anchovy, ENGRAULIS ENCRASICOLUS (Linnaeus) 1758 (Mediterranean and adjacent seas), by N. Demir, FAO Fisheries Synopsis No. 26 Revision 1, 47 pp., illus., processed, Nov. 1965, distribution restricted. Food and Agriculture Organization, Via delle Terme di Caracalla, Rome, Italy.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

AUSTRALIA:

Fisheries, Australia, Statistical Bulletin: No. 11-1964-65, 52 pp., illus., processed, July 1966. Commonwealth Bureau of Census and Statistics, Canberra, Australia. Reports 1964/65 fiscal year statistics on Australia's marine and fresh-water fisheries. Includes all commercial production of both marine and fresh-water fishery products. Included are data on vessels and equipment, persons engaged, production and gross value, consumption, and foreign trade.

BAIT:

"Baits for the marine fisherman--from clams to squid, what the fisherman can put on the hook to get results," by Irwin M. Alperin, article, The Conservationist, vol. 20, no. 5, April-May 1966, pp. 21-29, 34, illus., printed, 50 cents a copy. The Conservationist, New York State Conservation Department, Room 324, State Office Campus, Albany, N. Y. 12226.

BIOCHEMISTRY:

Available from American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006:

"Deoxyribonucleases in tissues of marine origin," by John G. Georgatsos and O. Antonoglou, article, Chemical Abstracts, vol. 62, Jan. 4, 1965, Abstract No. 765a, printed.

"Deoxyribonucleic acids of crustacea," by Michael Smith, article, Chemical Abstracts, vol. 61, Oct. 26, 1965, Abstract No. 11067d, printed.

"Histochemical characterization of cells rich in sialic acid found in the pars distalis of the hypophysis of the carp, *Cyprinus carpio*," by Claude Leray, article Chemical Abstracts, vol. 62, May 24, 1965, Abstract No. 13553d, printed.

"Leucine aminopeptidase activity in mesenteric mast cells of the carp," by A. Stolk, article, Chemical Abstracts, vol. 61, Nov. 9, 1964, Abstract No. 12375b, printed.

"Rapid measurement of inosine monophosphate and total adenosine nucleotides in fish tissue," by John Spinelli and Barbara Kemp, article, Journal of Agricultural and Food Chemistry, vol. 14, Mar.-Apr. 1966, pp. 176-181, printed.

"On the structure of the emulsifiers in gastric juice from the crab, *Cancer pagurus* L.," by André Van den Oord, Henry Danielsson, and R. Ryhage, article, Journal of Biological Chemistry, vol. 240, May 1965, pp. 2242-2247, printed. American Society of Biological Chemists, Inc., 428 E. Preston St., Baltimore, Md. 21202.

BRAZIL:

"Alguns aspectos sobre a biologia e a pesca do camarão 'rosa' da Região Centro-Sul do Brasil" (Some observations on the biology and fishery for "red" shrimp of the South-Central Region of Brazil), by G. De S. Neiva, article, Revista Nacional da Pesca, vol. VII, no. 52, June 1966, pp. 9-12, illus., printed in Portuguese. Revista Nacional da Pesca, Rua Xavier de Toledo 210, São Paulo, Brasil.

BRITISH GUIANA:

"The Sciaenid fishes of British Guiana," by Rosemary H. Lowe (McConnell), article, Bulletin of Marine Science, vol. 16, no. 1, March 1966, pp. 20-57, illus., printed, single issue \$3.50. Institute of Marine Science, University of Miami, Virginia Key, Miami, Fla. 33149. (Sold by University of Miami Press, Coral Gables, Florida.) Twenty-five species of croaker were collected in British Guiana, with many commercially very important as food. This paper gives a field key for their identification, as well as records what is known about their natural history.

CANADA:

"The Atlantic salmon in Greenland waters," by Dr. Paul M. Hansen, article, The Atlantic Salmon Journal, Spring 1966, pp. 3, 4, 5, 6, 35, 36, illus., printed. The Atlantic Salmon Association, Inc. 1559 McGregor St., Montreal 25, Canada.

Printed in French and English. Industry Division, Dominion Bureau of Statistics, Ottawa, Canada. (Sold by Queen's Printer and Controller of Stationery, Ottawa, Canada.)

Fisheries Statistics, Alberta and Northwest Territories, 1964 (La Statistique des Pêches, Alberta et Territoires du Nord-Ouest), Catalogue No. 24-212, 13 pp., 1966, C\$0.50.

Fisheries Statistics, Quebec, 1964 (La Statistique des Pêches, Québec, 1964), Catalogue No. 24-206, 32 pp., May 1966, C\$0.50.

Fisheries Statistics, Prince Edward Island, 1964, Catalogue No. 24-203, 23 pp., April 1966, C\$0.50.

Population Dynamics of the Petrale Sole (EOPSETTA/JORDANI) in Waters of Western Canada, by K. S. Ketchen and C. R. Forrester, Bulletin no. 153, 195 pp., illus., printed, C\$3.75. Fisheries Research Board of Canada, Ottawa. (Sold by Queen's Printer, Ottawa, Canada.)

Quelques Données sur la Biologie de L'éperlan, OSMERUS EPELANUS MORDAX (Mitchill) du Saint-Laurent, (Some Data on the Biology of the Smelt of the St. Lawrence), by Etienne Magnin and Gérard Beaulieu, Travaux sur les Pêcheries du Québec, no. 9, pp. 81-105, illus., printed in French, 1965. Direction des Pêcheries, Ministère de l'Industrie et du Commerce, Québec, Canada.

Journal of the Fisheries Research Board of Canada, printed, single issue Canada, Mexico, and U. S. C\$1, other countries C\$1.25. Fisheries Research Board of Canada, Sir Charles Tupper Bldg., Ottawa 8, Canada. (Sold by Queen's Printer, Ottawa, Canada.) Selected articles.

Vol. 22 (1965), no. 4 (April): "Time-Lapse Photography of an ASDIC Echo-Sounder PPI-Scope as a Technique for Recording Fish Movements During Migration," by C. Groot and W. L. Wiley, pp. 1025-1034, illus.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

- Vol. 22 (1965), no. 6 (June): "Supplementary Checks on the Scales of Pink Salmon (*Oncorhynchus gorbuscha*) and Chum Salmon (*O. keta*)," by H. T. Bilton and W. E. Ricker, pp. 1477-1489, illus.
- Vol. 21 (1964), no. 5 (May): "A Key to Five Species of Pacific Salmon (Genus *Oncorhynchus*) Based on Scale Characters," by H. T. Bilton, D. W. Jenkinson and M. P. Shepard, pp. 1267-1288, illus. "Preliminary Results of Studies on Growth and Mortality of Pacific Cod (*Gadus macrocephalus*) in Hecate Strait, British Columbia," by K. S. Ketchen, pp. 1051-1067, illus. "Growth Rate of Central British Columbia Pink Salmon (*Oncorhynchus gorbuscha*)," by R. J. LeBrasseur and R. R. Parker, pp. 1101-1128, illus. "A Model for Simulation of the Population Biology of Pacific Salmon," by P. A. Larkin and A. S. Houserton, pp. 1245-1265, illus. "Preliminary Observations on the Vertical Distribution of Pacific Salmon (Genus *Oncorhynchus*) in the Gulf of Alaska," by J. I. Manzer, pp. 891-903, illus.
- Vol. 21 (1964), no. 6 (June): "Growth, Reproduction, and Distribution of Pandalid Shrimps in British Columbia," by T. H. Butler, pp. 1403-1452, illus.
- Vol. 23 (1966), no. 5 (May): "Sexual maturity and spawning of the American plaice, *Hippoglossoides platessoides* (Fabricius) from Newfoundland and Grand Banks areas," by T. K. Pitt, pp. 651-672; "Free drip, flesh pH, and chalkiness in halibut," by N. Tomlinson, S. E. Geiger, and E. Dollinger, pp. 673-680; "Pilot plant fractionation of marine oils methyl esters," by Peter M. Jangaard, pp. 681-687; "Partial freezing as a means of preserving various species of groundfish," by S. W. Roach, N. Tomlinson, S. E. Geiger, and E. Dollinger, pp. 701-713; "Change in size-class structure of populations of Kodiak Island commercial male king crabs due to fishing," by Richard B. Nickerson, Frank J. Osslander, and Guy C. Powell, pp. 729-736; "Number of circuli and time annulus formation on scales of pink salmon (*Oncorhynchus gorbuscha*)," by Roger E. Pearson, pp. 747-756; "Analysis of an aerial census of ringed seals," by I. A. McLaren, pp. 769-773; "Some equilibrium moisture values of fresh and salt cod," by D. L. Cooper and T. C. Noel, pp. 775-778.
- Vol. 23 (1966), no. 6 (June): "Biological characteristics of a herring population on the south coast of Newfoundland," by R. D. Humphreys, pp. 797-804; "Food and growth of fishes. II. Effects of food and temperature on the relation between metabolism and body weight," by J. E. Paloheimo and L. M. Dickie, pp. 869-908; "Vitamins B in dulse (*Rhodomenia palmata*)," by Akio Kanazawa, Akira Saito, and D. R. Idler, pp. 915-916; "Evidence for the binding of oil in salmon canned after storage in ice or in a partially frozen condition," by E. Bilinski, G. Lang, and N. Tomlinson, pp. 917-919; "Nucleotide interference with glycogen estimation in white and red muscle of cod," by Doris I. Frazer, E. Lo, and W. J. Dyer, pp. 921-924; "Influence of fishing methods on the incidence of chalkiness in halibut," by N. Tomlinson, S. E. Geiger, and E. Dollinger, pp. 925-928; "Characteristics of scales from pink salmon (*Oncorhynchus gorbuscha*) transplanted from the Glendale River in central British Columbia to the North Harbour River in Newfoundland," by H. T. Bilton, pp. 939-940.
- Vol. 23 (1966), no. 7 (July): "Some commercial Atlantic herring oils; fatty acid composition," by R. G. Ackman and C. A. Eaton, pp. 991-1006; "Lipids of cod muscle and the effect of frozen storage," by E. G. Bligh and Margaret A. Scott, pp. 1025-1036; "Ocean migration and distribution of fish-marked coho salmon," by George H. Allen, pp. 1043-1061; "Taste panel assessment of cod filets after single and double freezing," by W. A. MacCallum, E. J. Laishley, W. J. Dyer, and D. R. Idler, pp. 1063-1081; "Deck sampling of research vessel catches," by A. W. May and V. M. Hodder, pp. 1083-1088; "A portable press for making impressions of salmon scales," by D. W. Jenkinson and K. Sutherland, pp. 1089-1093.
- Vol. 23 (1966), no. 1 (January): "Underwater observations on fish in an off-bottom trawl," by William L. High and Larry D. Lusz, pp. 153-154.
- CATFISH:
"Missouri river channel cats," by Thomas R. Russell, article, *The Conservationist*, vol. 27, no. 7, July 1966, pp. 4-5, illus printed, Missouri Department of Conservation, North 10-Mile Drive, Jefferson City, Mo. 65102.
- CHESAPEAKE BAY:
Chesapeake Science, vol. 7, no. 2, June 1966, pp. 59-115, illus., printed, single copy 75 cents. Natural Resources Institute, University of Maryland, Chesapeake Biological Laboratory, Solomons, Md. 20688. Includes, among others, these articles: "Food habits and distribution of the fishes of Tuckahoe Creek, Virginia, with special emphasis on the bluegill, *Lepomis M. macrochirus Rafinesque*," by David A. Flemer and William S. Woolcott; "Effects of acute gamma irradiation on the blood constituents of pinfish, *Lagodon rhomboides*," by David W. Engel, Joseph W. Angelovic, and Edna M. Davis; "Notes on the biology of the sea nettle, *Chrysaora quinquecirrha* in Chesapeake Bay," by David G. Cargo and Leonard P. Schultz; "The mountain stripback darter, *Percina notogramma montuosa*, n. ssp. from upper James River, Virginia," by William T. Hogarth and William S. Woolcott; "Feeding of naturally occurring toxic oysters, *Crassostrea virginica*, to chicks"; "A comment on the origin of the fourth fold in the mantle of the quahog, *Mercenaria mercenaria*."
- CLAMS AND CUTLEFISH:
"Composition and flavor of clams and cuttlefish," by Shigezo Udo and Tadashi Sato, article, *Chemical Abstracts*, vol. 62, Mar. 15, 1966, Abstract No. 70355, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.
- CRABS:
"Partitioning of the estuarine environment by two species of Cancer," by H. Perry Jeffries, article, *Ecology*, vol. 27, no. 3, Late Spring 1966, pp. 477-481, illus., printed. Ecological Society of America, 6697 College Station, Durham, N. C. 27708.
- DENMARK:
Bulletin Statistique des Pêches Maritimes (Marine Fisheries Statistical Bulletin), vol. XLVIII, 1963, 67

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

pp., printed in English. January 1966, Kr. 25.00 (about US\$3.61). Consell Permanent International pour l'Exploration de la Mer, Charlottenlund Slot, Denmark. This publication provides these general statistical tables: total value and quantity of the sea-fisheries in the different countries; quantity and value of fish landed by all countries 1963; special tables: quantity of fish landed by some countries in 1963 for which data concerning the fishing activity (effort) in 1963 are available; percentages of the total quantity of the different species caught in the North Sea by trawl, Danish seine, line and other gear respectively 1963; monthly tables: monthly quantities landed from the North Sea 1963; monthly data on the herring fisheries 1963.

ECUADOR:

Apuntes e Informaciones Sobre la Situación de la Producción Pesquera Ecuatoriana y Sus Mercados (Information on the Situation of Ecuadorian Fishery Production and Its Markets), by Domingo Quiroga and Anibal Orbes Armas, Boletín Informativo, vol. 1, no. 3, 1964, 31 pp., printed in Spanish. Instituto Nacional de Pesca del Ecuador, Guayaquil, Ecuador.

EELS:

"The early development of the spotted worm eel Myrophis punctatus Lütken (Ophichthidae)," by Bonnie Eldred, Immature Vertebrates Leaflet Series, vol. IV, part 1 (Pisces), no. 1, May 1, 1966, 13 pp., illus., processed. Florida Board of Conservation, Marine Laboratory, Bayboro Harbor, St. Petersburg, Fla.

EL SALVADOR:

Foreign Trade Regulations of El Salvador, Overseas Business Reports, OBR 66-17, 8 pp., printed, Apr. 1966, 15 cents. Bureau of International Commerce, Washington, D. C. (For sale by Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, and by Department of Commerce field offices in principal cities in the United States.)

FAUNA:

"Abdominal section of Panulirus argus," by Jean Williams, Invertebrate Fauna Leaflet Series, vol. 3, no. 1, Sept. 1, 1966, 4 pp., illus., processed. Florida Board of Conservation, Marine Laboratory, Bayboro Harbor, St. Petersburg, Fla.

FINLAND:

Forändringar hos Fiskmuskelproteiner vid Nedfrysningen och deras Inhibering med Hjälp av Fosfater (Undersökning av reaktionsmekanismen med hjälp av tracerteknik)--Changes in Fish Proteins in Freezing and Their Inhibition with Phosphates (Research of the reaction mechanism with tracer technique), by Taina Kuusi, Olavi E. Nikkilä, and Riitta Kytökan-gas, Sarja IV--Kemla 78, 1965, 11 pp., illus., printed in Finnish with English summary. Valtion Teknillinen Tutkimuslaitos, The State Institute for Technical Research, Helsinki, Finland.

FISHERY BIOLOGY:

On the Dynamics of Exploited Fish Populations, by R. J. H. Beverton and S. J. Holt, Fishery Investigations Series II, vol. XIX, 533 pp., illus., printed, 1957, US\$25.00. Sales Section, British Information Service, 845 Third Avenue, New York, N. Y. 10022.

More and more nations are turning to the sea for food and industrial products. As a result, harvesting of the sea's resources has been intensified. This means that in order to conserve those resources for maximum sustainable yield for this generation and those that are to follow, it will be necessary to solve the many problems of regulation. The authors of this book point out that there are solutions to problems of fishery regulation provided the right data are available. If the data are not available, this book shows what data are needed. Mathematics is, of course, the basis for many of the methods advocated by the authors, but they have written for non-mathematicians by explaining fully and illustrating generously. Although directly relevant to the better use of the stocks of fish in the North Sea, the book is not written on so narrow a basis, but as a guide in conservation problems over a larger field. Part I deals with fundamentals of the theory of fishing, illustrated by analysis of a trawl fishery. Some extensions of the simple theory of fishing are covered in Part II. Explained in this part are recruitment and egg-production; natural mortality; fishing mortality and effort; growth and feeding; spatial variation in the values of parameters; and mixed populations. Part III explains estimation of parameters. Part IV discusses the use of theoretical models in a study of the dynamics and reaction to exploitation of fish populations. Included in Part IV are: principles and methods of fishery regulation; attainment of the objectives of optimum fishing; and the regulation of an international fishery. The appendices contain tables; list of symbols and their definitions; and derivations of indices of total European fishing effort on North Sea plaice and haddock during the prewar period. The book concludes with a bibliography and author index, and a good subject index. Although published in 1957, it is still available and should be a basic reference for biologists, scientists, and fishery administrators dealing with prediction of fishery resources in the high-seas and the regulation of fisheries exploited by several nations.

--J. Fileggi

FISHERY RESEARCH:

An Annotated Listing of the Fish Reference Collection at the Florida Board of Conservation Marine Laboratory, by Martin A. Moe, Jr., and others, Special Scientific Report No. 10 (Contribution No. 99), 121 pp., processed, May 1966. Florida Board of Conservation, Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Fla.

FISH FARMING:

Warm-Water Ponds for Fishing, by W. W. Neely, Verne E. Davison, and Lawrence V. Compton, Farmers' Bulletin 2210, 16 pp., illus., printed, May 1965, 10 cents. U. S. Department of Agriculture, Washington, D. C. (For sale by Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) A pond that provides good fishing is a profitable and pleasant feature of a farm or ranch. This bulletin is specific only for "warm-water" ponds--not for "cool-water" or "cold-water" ponds. It points out the importance of site, erosion control, proper stocking, adequate fertility, and weed control. It explains how to manage a warm-water pond for profitable fishing.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

FISH MEAL:

"Analysis of lipids in fish meal," by Paul F. Parks and Mildred Hummel, article, *Journal of the Association of Official Agricultural Chemists*, vol. 48, Aug. 1965, pp. 781-785, printed. Association of Official Agricultural Chemists, Inc., Box 540, Benjamin Franklin Station, Washington, D. C. 20004.

FISH PROTEIN CONCENTRATE:

"Fish: new frontier for chemicals?" article, *Chemical Week*, vol. 99, no. 1, July 2, 1966, pp. 19-20, illus., printed, single copy \$0.50. McGraw-Hill, Inc., 330 W. 42nd St., New York, N. Y. 10036. Chemical Week, P. O. Box 430, Hightstown, New Jersey 08520.

FOOD AND AGRICULTURE ORGANIZATION:

Available from Food and Agriculture Organization, Via delle Terme di Caracalla, Rome, Italy:

Report of the FAO Symposium on the Significance of Fundamental Research in the Utilization of Fish (Husum, Federal Republic of Germany, 26-30 May 1964), FAO Fisheries Reports, No. 19, 55 pp., processed, 1965. This is a report of the symposium hosted by the Federal Republic of Germany and held from May 26-30, 1964, in Husum. This meeting was held to assist industries concerned with fish distribution and processing. Session reports cover: Rigor mortis; problems related to the preservation of fresh fish; production and storage of fish protein concentrate; and others. Summaries include: From the viewpoint of fundamental research, applied research, and the fishing industry.

Report on the Effects of Fishing on the Peruvian Stock of Anchovy, by L. K. Boerema, G. Saetersdal, I. Tsukayama, J. E. Valdivia, and B. Alegre, FAO Fisheries Technical Paper No. 55, 47 pp., illus., processed, Dec. 1965, distribution restricted. Presents a summary of biological information available; analyses of length, catch, effort, and catch per unit of effort; estimates of mortality. Discusses conclusions and gives recommendations.

FRANCE:

"La pêche Française en 1965 - L'an dernier, les apports de poisson frais ont atteint le chiffre de 401,000 t" (French fisheries in 1965--last year the landings of fresh fish totaled 401,000 tons), *La Pêche Maritime*, vol. 45, no. 1059, June 1966, pp. 455-464, illus., printed in French. La Pêche Maritime, 190 Boulevard Haussmann, Paris 8e, France.

GEAR:

"For precision fishing: depth telemetry," article, *Fishing Gazette*, vol. 82, Nov. 19, 1965, pp. 19, 29, printed. Fishing Gazette Publishing Corp; 462 Eighth Ave., New York, N. Y. 10001.

GERMANY, EAST:

"Über die artselektivität beim elektrischen fischfang" (Species selection in electric fishing), by J. Libosvarsky and A. Lelek, article, *Zeitschrift für Fischerei und deren Hilfswissenschaften*, vol. 13, no. 3-4, November 1965, pp. 291-301, printed in German with English and Russian summaries. Neumann Verlag, Dr.-Schmincke-Allee 19, Radebeul 1, East Germany.

HONG KONG:

Annual Departmental Reports, 1964-65, 121 pp., illus., printed. Director of Agriculture and Fisheries, Hong Kong. (S. Young, Government Printer at the Government Press, Java Road, Hong Kong.) There is a section on the fisheries service which discusses the fishing fleet, fish marketing organization, credit facilities for fishermen, co-operative societies, the fisheries division, and the fisheries research station.

ILLINOIS:

Man's Effect on the Fish and Wildlife of the Illinois River, by Harlow B. Mills, William C. Starrett, and Frank C. Bellrose, Biological Notes No. 57, 24 pp., illus., printed, June 1966. Illinois Department of Registration and Education. Natural History Survey Division, Natural Resources Bldg., Urbana, Ill. 61801.

INDIA:

Annual Report of the Department of Fisheries, 1963-64, 64 pp., illus., printed, November 1964. Director of Fisheries, Maharashtra State, Bombay, India. The report presents the progress of the fishing industry in the State of Maharashtra during 1963-64. Along with the incentives and facilities provided in the field of production, it also describes the measures adopted by the Government in financing the industry; improving the preservation, transport, and marketing facilities; training of "fisher-youths" and for the amelioration of the socio-economic condition of the fishing community.

Indian Journal of Fisheries, vol. IX, section A, no. 2, October 1962, pp. 434-869, illus., printed, single copy 8 rupees net (US\$1.70). Ministry of Food and Agriculture of Government of India, New Delhi, India. Includes articles on: "Observations on the fishery and biology of the fresh-water prawn *Macrobrachium malcolmsonii*, Milne Edwards of River Godavari," by K. H. Ibrahim, pp. 433-467; "Observations on the size groups of *Penaeus indicus* (Milne Edwards) in the commercial catches of different nets from the backwaters of Cochin," by M. J. George, pp. 468-475; "Examination of the efficiency of mackerel fishing," by S. K. Banerji and D. Chakraborty, pp. 499-505; "A method for estimating trawler catches," by M. D. K. Kuthalingam, pp. 506-511; "On the mackerel fishery of the Mangalore area during the period 1957-61," by V. Ramamohana Rao, K. V. Sekharan and M. J. Pradhan, pp. 653-678; "On the oil sardine fishery of the Calicut area during the years 1955-56 to 1958-59," by K. V. Sekharan, pp. 679-700; "Physico-chemical and biological conditions in selected paddy fields in Orissa with special reference to fish culture," by G. N. Saha and K. V. Ramakrishna, pp. 728-737; "Government of India Central Marine Fisheries Research Institute, Marine Fisheries P. O., Mandapam Camp, South India (Annual Report of the Director for the year ending 31st March 1962)," pp. 746-822; "Government of India Annual report of the Central Inland Fisheries Research Institute, Barrackpore, for the year ending 31st March 1962," pp. 823-869.

Seafood Trade Journal, vol. 1, no. 5, May 1966, 46 pp., illus., printed in English. The Seafood Cannery and Freezers' Association of India, Cochin, India. Includes articles on: "Fishing industry and the plan," pp. 5-8; "The Indian shrimp industry (an apprecia-

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tion of its progress)" pp. 9-10; "India's fourth five year plan" (Provision for development of fisheries - Annual plan for 1966-67 envisages outlay of Rs. 11,58,00,000 - Kerala to spend the highest) pp. 13, 14, 15, 17, 19, 21.

INTERNATIONAL COMMISSION FOR THE NORTH-WEST ATLANTIC FISHERIES:

ICNAF Environmental Symposium (Held in the Headquarters of FAO, Rome, 1964), Special Publication No. 6, 920 pp., illus., with Corrigenda (pp. 611-623), printed, 1965. International Commission for the Northwest Atlantic Fisheries, Dartmouth, Nova Scotia, Canada.

INTERNATIONAL NORTH PACIFIC FISHERIES COMMISSION:

Available from International North Pacific Fisheries Commission, 6640 Northwest Marine Dr., Vancouver 8, B. C., Canada.

Annual Report 1964, 130 pp., illus., printed, 1966.

Salmon of the North Pacific Ocean, Part V, Offshore

Distribution of Salmon, by J. I. Manzer, T. Ishida, A. E. Peterson, and M. G. Hanava, Bulletin No. 15, 452 pp., illus., printed 1965. Describes the offshore distribution of salmon as determined from information obtained from research vessel operations and records of commercial fishing vessels.

INTERNATIONAL PACIFIC HALIBUT COMMISSION:

Pacific Halibut Fishery Regulations (Effective March 23, 1966), 11 pp., illus., printed 1966. International Pacific Halibut Commission, Fisheries Hall No. 2, University of Washington, Seattle, Wash. 98105.

IRRADIATION PRESERVATION:

"Fishing irradiation aboard vessels nearing reality," by Ronald B. Harrison, article, National Maine Coast Fisherman, vol. 46, Sept. 1965, pp. 4, 16, printed. National Maine Coast Fisherman, 22 Main St., Camden, Me. 04843.

"Use of ionizing radiation for preserving fish products," by M. S. Bidenko, article, Chemical Abstracts, Aug. 30, 1965, Abstract No. 6239g, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

ITALY:

"Development of the frozen food industry in Italy," by Walter Pichel, article, ASHRAE Journal, vol. 8, Mar. 1966, pp. 80-81, printed. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 345 East 47th St., New York, N. Y. 10017.

JAPAN:

Fisheries and Agriculture Production Statistics for 1964, 311 pp., illus., printed in Japanese, February 1966; 1,500 yen (US\$4.20), postage extra. Statistical Research Division, Agriculture-Forestry Economics Bureau, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-ku, Tokyo. (Sold by Agriculture-Forestry Statistical Association (Norin Tokai Kyokai), Otori Building, 460-banchi, 2-chome, Shimo-meguro, Meguro-ku, Tokyo, Japan. Annual statistical bulletin on fisheries published by Japan-

ese Government, showing production trends by fisheries, species, prefectures, and value; numbers of fisheries management units, fishermen and fishing craft, etc.

Fisheries Statistics of Japan 1964, 55 pp., illus., printed in English, March 1966, Statistics and Survey Division, Ministry of Agriculture and Forestry, 1, 2 Cho-Me, Kasumigaseki, Chiyoda-Ward, Tokyo, Japan. This is the second in the series of new publications issued especially for foreigners. It gives detailed data on Japan's 1964 fish catch; production of products, imports and exports, costs and earnings, and other economic data of the fishing industry. Some tables give comparative data for 1963, the first year for which this series of publications was issued. Included also are appendices giving the classifications of types of fisheries and groups of fishes, and illustrations of the species of fish, shellfish, marine mammals, and other aquatic plants and animals taken by Japanese fishermen. Species illustrations show the English, Japanese, and scientific names.

The Salmon Resources and Salmon Fisheries Around the Pacific Ocean, by Kisaburo Taguchi, 390 pp., illus., printed in Japanese, January 1966; 2,800 yen (US\$7.80), postage extra. Koseisha Koseikaku, 8-banchi, Sanei-cho, Shinjuku, Tokyo, Japan.

The Tohoku Journal of Agricultural Research, vol. 16, no. 2, September 1965, pp. 93-157, illus., printed. Library, Faculty of Agriculture, Tohoku University, Sendai, Japan. Contains, among others, articles on: "Agarose and agarpectin in Gelidium- and Gracilaria-agar," by Yasuhiko Tsuchiya and Kap Chun Hong; and "Presence of 17B-hydroxysteroid dehydrogenase activity in the tissues of maturing oysters," by Katsuyoshi Mori, Hideo Tamate, and Takeo Imai.

KUWAIT:

"Kuwait - One year after," article, World Fishing, vol. 15, no. 5, May 1966, pp. 50-51, illus., printed, single issue 3s. 6d. (US\$0.50). Grampian Press Ltd., The Tower, 229-243 Shepherd's Bush Road, Hammersmith, London W.6, England. Over the past year or so, considerable attention has been given to the fisheries of the Middle East by European operators: one venture which immediately springs to mind is that being undertaken by Britain's Ross Group in the Persian Gulf. This is a progress report on the shrimp fleet built in Norway in 1965 for Kuwait.

LAKE ERIE:

"The dying lake," by Barbara Tuft, article, Science News, vol. 90, no. 1, July 2, 1966, pp. 10-11, printed, single copy 15 cents. Science Service, Inc., 1719 N St. NW., Washington, D. C. 20036. The reference is to Lake Erie and describes the plight of that lake because of the industrial pollution flowing into it.

MARINE BIOLOGY:

"The temperature tolerances of three species of marine fishes," by James G. Hoff and James R. Westman, article, Journal of Marine Research, vol. 24, no. 2, May 15, 1966, pp. 131-140, illus., printed. Sears Foundation for Marine Research, Bingham Oceanographic Laboratory, Yale University, New Haven, Conn. 06520.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Unit responses from commissural fibers of optic lobes of fish," by John M. Dietschy and Norman W. Carter, article, *Science*, vol. 152, no. 3723, May 6, 1966, pp. 797-799, illus., printed. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

MUSSELS:

"Mussels' swift yield, large supply offer great potential for freezing," by Cyrus Adler, article, *Quick Frozen Foods*, vol. XXVIII, no. 11, June 1966, pp. 123-124, 126-127, illus., printed. E. W. Williams Publications, Inc., Division of Cannery Publishing Co., 1776 Broadway, New York, N. Y. 10019.

NEW ZEALAND:

"Experiments with escape gaps in crayfish pots," by R. J. Street, pp. 10-11; "Smoked fish sausage," p. 27, articles, *Commercial Fishing*, vol. 4, no. 9, May 1966, illus., printed. Trade Publications Ltd., 26 Albert Street, Auckland, New Zealand.

NORWAY:

Articles from *Fiskets Gang*, illus., printed in Norwegian. Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

"Forekomst av egg og yngel av fisk i vest- og nordnorske kyst- og bankfarvann varen 1965" (Occurrence of eggs and young of fish in the western and northern coasts and banks during spring 1965), by Olav Dragesund and Per T. Hogenstad, vol. 52, no. 24, June 16, 1966, pp. 467-472.

"Rapport om tokt med G. O. Sars til Lofoten og Barentshavet fra 17. Februar til 1. April 1966" (Report on G. O. Sars cruise to Lofoten and Barents Sea, February 17 to April 1, 1966), by John Lahn-Johannessen, Dag Moller, and Steinar Olsen, vol. 52, no. 23, June 9, 1966, pp. 446-451.

OCEANOGRAPHY:

Journal of Marine Research, vol. 24, no. 2, May 15, 1966, pp. 105-266, printed, \$5.00. *Journal of Marine Research*, Sears Foundation for Marine Research, Bingham Oceanographic Laboratory, Yale University, New Haven, Conn. 06520. Contains these articles, among others: "The temperature tolerances of three species of marine fishes," by James G. Hoff and James R. Westman; and "Further measurements and observations on the Cromwell Current," by J. A. Knauss.

"Ocean engineering takes the plunge," by Tom Alexander, article, *Fortune*, vol. LXXIII, no. 6, June 1966, pp. 145-147, 210, 214, 216, illus., printed, single copy \$1.50. *Fortune*, 540 N. Michigan Ave., Chicago, Ill. 60611.

Oceanographical Observations in the Indian Ocean in 1963, H.M.A.S. Diamantina, Cruise Dm3/63 (Seasonal Biological Cruise No. 8), Oceanographical Cruise Report No. 25, 149 pp., illus., processed, 1965. Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia.

The Ocean World, by Vladimir and Nada Kovalik, 191 pp., illus., printed, 1966, \$4.50. Holiday House, Inc., 8 West 13th Street, New York, N. Y. 10011. This

book may be slanted to the young reader or the budding oceanographer but will be stimulating to both young and adult interested in marine science. The old notion of the "seven seas" must be tossed out, according to the authors of this book, in the realization that there is but one ocean, a global sea in which all waters eventually meet. Putting together the curious facts and ingenious theories concerning this world ocean--a gigantic sheet of water--is the job of oceanography. This book takes the reader beneath the sea to introduce its fascinating animals and plants, the wide-ranging mountains that stand where the ocean's bed was once thought to be flat, the experimental undersea capsules in which man is learning to live and work, the mining of metals and oil from the bottom. The authors describe underwater photography, "cores" of sediment that reveal the earth's ancient history, submarine "farming," surprising new ways of detecting and catching fish for the world's exploding food needs, the ingenious new instruments that marine scientists use today, and much more. The authors write simply and without affectation in explaining the teeming life in the sea, including plankton, the various forms of ocean plants, pises or the bony fish, mammals, and even "sea serpents," notably the Loch Ness monster which a South African scientist says unquestionably exists. In addition to presenting the panorama of an exciting new world beneath the waves and exploring it scientifically, this book offers practical helps to young people interested in the many careers open in oceanography. Included is a list of colleges and universities offering degrees in marine science, names of oceanographic institutions, and names of private firms engaged in oceanographic research.

-- G. A. Albano

OYSTERS:

"Homes for oysters," by W. J. Demoran, article, *Mississippi Game & Fish*, vol. 26, no. 3, May-June 1966, pp. 12-13, illus., printed. Mississippi Game and Fish Commission, Jackson, Miss.

PERCH:

"Hemoglobins of the saw perch. II," by Anastasios A. Christomanos, article, *Chemical Abstracts*, Feb. 1, 1965, Abstract No. 2939g, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

PHYTOPLANKTON:

Phytoplankton Leaflet series, vol. 1, parts 1-3, illus., processed. Available from Florida Board of Conservation, Marine Laboratory, Bayboro Harbor, St. Petersburg, Fla.:

Part 1 (Dinoflagellates), No. 1--"Ceratium trichoceros (Ehrenberg) Kofoid," by Joanne T. Davis and Karen A. Steidinger, May 1966, 3 pp.

Part 2 (Diatoms) No. 1--"Rhizosolenia setigera Brightwell," by Carol L. Wahlquist, April 1966, 4 pp.

Part 3 (Artificial Culture) No. 1--"Rhodomonas baltica Karsten," by Frank Detweiler, W. Farrow, and Stanton J. Erickson, September 1965, 4 pp.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Part 3 (Artificial Culture) No. 2 -- "Synechococcus elongatus (Naegeli)," by Stanton J. Erickson and W. Farrow, September 1965, 4 pp.

PLANKTON:

Plankton Leaflet Series, vol. 1, nos. 1-11, illus., processed. Available from Florida Board of Conservation, Marine Laboratory, Bayboro Harbor, St. Petersburg, Fla.

No. 1 - "Gymnodinium breve Davis," by Karen A. Steidinger, March 1, 1964, 2 pp.

No. 1a - "Gymnodinium breve Davis," by Karen A. Steidinger and Jean Williams, October 1, 1964, 2 pp.

No. 2 - "Skeletonema costatum (Greville) Cleve," by Karen A. Steidinger, April 1, 1964, 2 pp.

No. 3 - "Gymnodinium splendens Lebour," by Karen A. Steidinger, May 1, 1964, 2pp.

No. 4 - "Asterionella japonica Cleve et Moller ex Gran," by Richard P. Saunders, September 1, 1964, 2 pp.

No. 5 - "The isolation and characteristics of a chlorella-like green alga from the west coast of Florida," by Stanton J. Erickson, November 1, 1964, 2 pp.

No. 6 - "Ceratium fusus (Ehrenberg)," by Joanne T. Davis, December 1, 1964, 3 pp.

No. 7 - "Rhizosolenia stouterfothii Peragallo," by Carol L. Sherer, January 1, 1965, 3 pp.

No. 8 - "Melosira sulcata (Ehrenberg) Kutzing," by Richard P. Saunders, March 1, 1965, 4 pp.

No. 9 - "Ceratium hexacanthum Gourret 1883," by Joanne T. Davis, April 1, 1965, 3 pp.

No. 10 - "Exuviaella mariae - lebouriae, Park and Ballantine," by Bruce Birnhak and W. Farrow, June 1, 1965, 4 pp.

No. 11 - "Chaetoceros galvestonensis (Collier and Murphy, 1962)," by M. Lee Britton and W. Farrow, June 15, 1965, 4 pp.

POLAND:

"Polish Fisheries in 1961-70," article, Polish Maritime News, vol. IX, no. 94, June 1966, pp. 18-19, printed. Polish Chamber of Foreign Trade, Maritime Branch, ul. Pulaskiego 6, Gdynia, Poland.

PORTUGAL:

Available from Instituto das Industrias de Pesca de Angola, Cx. Postal 83, Luanda, Angola.

"Albacora uma pesca a expandir" (Yellowfin tuna--an expanding fishery), by A. Saraiva da Costa, article, Revista de Pesca e Navegação de Angola, vol. 1, no. 2, April 1966, pp. 29-35, illus., printed in Portuguese.

Revista de Pesca e Navegação de Angola, vol. 1, no. 1, December 1965, 64 pp., illus., printed in Portuguese. The first issue of a new periodical. Includes articles on: "Lançamento ao mar do Goa" (Launching of new fishery research vessel Goa), pp. 7-13; "Investigação e Pesca" (Research and fisheries), by A. Saraiva da Costa, pp. 15-18; "Fundo de apoio à indústria de Pesca" (Aid fund for fishing industry), by Manuel Abranches Pinto, p. 27; "Conservas de peixe" (Canned Fish), by A. Saraiva da Costa, pp. 51-54; "Legislação--regulamento do fundo de apoio as Industrias de pesca" (Legislation--regulation for the aid fund for the fishery industries), pp. 55, 56, 58, 60.

POULTRY RATIONS:

"Fish meal, amino acid and antibiotic fermentation residue supplementation of laying diets," by Syed M. Bul Bul, John W. Bradley, and J. H. Quisenberry, article, Poultry Science, vol. 44, Sept. 1965, p. 1357, printed. Poultry Science, Texas A & M College System, College Station, Tex. 77843.

"Unidentified factor sources for broiler rations," by Elbert J. Day and Ben C. Dilworth, article, Feedstuffs, vol. 37, July 31, 1965, pp. 74-76, printed. Feedstuffs, P. O. Box 67, Minneapolis, Minn. 55440.

SALMON:

Available from International Pacific Salmon Fisheries Commission, New Westminster, B. C., Canada.

The Effect of Transported Stream Sediments on the Survival of Sockeye and Pink Salmon Eggs and Alevin, by A. C. Cooper, Bulletin XVIII, 74 pp., illus., printed, 1965.

Histological and Hematological Changes Accompanying Sexual Maturation of Sockeye Salmon in the Fraser River System, by G. S. Colgrove, Bulletin XX, 32 pp., illus., printed, 1966.

Salmon Sport Fishing in the Tidal Waters of British Columbia, 1965, 36 pp., illus., processed. Department of Fisheries of Canada, Pacific Area, 1155 Robson St., Vancouver 5, B. C., Canada.

SEAWEED:

Annual Report for 1965, 17 pp., printed. Institute of Seaweed Research, Inveresk, Midlothian, Scotland. This report tells of the success of the British seaweed industry. Over the past 10 years the output of the alginate industry has increased fivefold. In the same period the manufacture of liquid seaweed fertilizer has increased 12-fold. Both products have worldwide distribution. The main functions of the Institute are to assist industry and foster interest in seaweed utilization. Information is furnished on: alginates from seaweed; seaweed meal in animal feedingstuffs; and seaweed as a manure.

"The effect of selected anions of potassium salts on the gel strength of carrageenan high in the kappa fraction," by Mary E. Zabik and Pearl J. Aldrich, article Journal of Food Science, vol. 30, Sept.-Oct. 1965, pp. 795-800, printed. Journal of Food Science, 510-524 North Hickory St., Champaign, Ill. 61820.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

SHRIMP:

"Brown shrimp outlook for 1966," article, *Louisiana Conservationist*, vol. 18, nos. 7 & 8, July-August, 1966, p. 5, illus., printed, Louisiana Wild Life & Fisheries Commission, 400 Royal Street, New Orleans, La. 70130.

SPAIN:

"Productividad en la Industria Conservera de Sardinia en Ayamonte" (Productivity in the sardine canning industry of Ayamonte), article, *Informacion Conservera*, vol. XIV, no. 148, April 1966, pp. 123-128, printed in Spanish. Informacion Conservera, Garrigues, 21, Valencia 1, Spain.

STURGEON:

Order Acipenseroides, by Vadim D. Vladikov and John R. Greeley, pp. 24-60, illus., printed, 1963. Ministère de la Chasse et des Pêcheries, Québec, Canada. (Reprinted from Memoir Sears Foundation for Marine Research, Yale University, New Haven, Connecticut 06520.)

TARIFF:

Tariff Schedules of the United States, Annotated, 1965, Supplement 4, TC Publication 163, pp. 97-98, 135-138, 283-284, 331-332, 337-338, 397-400, 507-509, 525-530, 597-598, 603-604, 633-634, 637-640, 643-644, 649-650, 653-657, processed, July 1, 1966. United States Tariff Commission, Washington, D. C. 20436. The pages in this supplement are to be substituted for the corresponding pages in the *Tariff Schedules of the United States Annotated* (1965).

TRADE LISTS:

Copies may be purchased by firms in the United States from the Commercial Intelligence Division, Office of International Trade Promotion, Bureau of International Commerce, Washington, D. C. 20230, or from Department of Commerce field offices.

Canneries and Frozen Foods--Producers and Exporters--Bolivia, 3 pp., processed, May 1966, \$1.00. Lists the names and addresses, size of firms, and types of products (including fishery products) handled by each firm. Also contains basic trade and industry data.

Canneries and Frozen Foods--Producers and Exporters--Iran, 5 pp., processed, May 1966, \$1.00. Lists the names and addresses, size of firms, and types of products (including fishery products) handled by each firm. Also contains basic trade and industry data.

Canneries and Frozen Foods--Producers and Exporters--Italy, 23 pp., processed, May 1966, \$1.00. Lists the names and addresses, size of firms, and types of products (including canned and frozen fish) handled by each firm. Also contains trade and industry data (including fishery products).

TRANSPORTATION:

"Seafood air transport wisely used offers sales advantage, savings," article, *Quick Frozen Foods*, vol. XXVIII, no. 12, July 1966, pp. 105-106, 108, illus., printed. E. W. Williams Publications, Inc., Division of Canners Publishing Co., 1776 Broadway, New York, N. Y. 10019. The growing value of many

seafoods has made it practical to fly quantities in from great distances and still sell them profitably. A report on this growing trend.

TUNA:

Statistics of Japanese Tuna Fishery, 1965 (as of end of 1963), 34 pp., illus., printed in English, 1965 Edition. Federation of Japan Tuna Fishermen's Cooperative Associations and Japan Tuna Fisheries Federation, Tokyo. This publication gives detailed data on the Japanese skipjack and other tuna fisheries all over the world. Included are sections on numbers of fishing vessels, catch, unit of effort, landings at foreign ports, mothership type fishery, world statistics, exports, processed products, and prices.

U.S.S.R.:

Kholodilnaia Tekhnika, vol. 2, 1966, 64 pp., illus., printed in Russian. (Soviet) All-Union Scientific Research Institute of the Refrigeration Industry, Moscow, U.S.S.R. (Editor's address: Ulitsa Kostyakova 12, Moskva, U.S.S.R.) Includes articles on: "Investigations on storage of North Sea herring in chilled sea water. I. Technological investigations," by A. I. Piskarev, L. G. Lukyanitsa, L. V. Ushkalova, N. V. Ogurechnikova, G. V. Dudarev, V. P. Fominova, and M. U. Sangailene, pp. 32-36; "Investigations on storage of North Sea herring in chilled sea water. II. Biochemical investigations," by S. I. Konopkaite, Y. A. Dachyulite, and K. U. Pakarskite, pp. 36-40; "Investigations on storage of North Sea herring in chilled sea water. III. Microbiological investigations," by E. L. Moiseyeva, pp. 41-42.

Articles from *Rybnoe Khoziaistvo*, printed in Russian, single copy 50 kopecks (about 56 U.S. cents). *Rybnoe Khoziaistvo*, V. Krasnoyarskaya 17, Moscow B-140, U.S.S.R. Selected articles.

No. 2, February 1966: "Conservation of immature Black Sea mullet (*Mugil ramada*)," by M. Ya Savchuk, pp. 10-12; "Potential development of acclimatization studies in the Soviet Union," by V. S. Maliutin, pp. 12-14; "The results of tagging pink salmon (*Oncorhynchus gorbuscha*) off the western shores of the Uturup Island," by V. N. Ivankov, pp. 15-18; "Floating device for gathering and transporting fish," by B. S. Malevanchik, pp. 23-26; "Diseases of carp (*Cyprinus carpio*) air bladder," by I. I. Gevkan, V. M. Ivasik and I. M. Karpenko, pp. 27-28; "SMG-1 hydraulic net-shaking machine," by M. B. Tsybushnik and O. P. Shakhov, pp. 31-35; "Our proposals for improving the BMRT-type vessels," by V. E. Kovylin, pp. 36-39; "The use of color twine in trawl construction," by A. Griadunov, pp. 39-40; "Flashing signal lights for different types of fishing," by Iu. I. Vykhovskii, pp. 40-43; "Soviet scientists are founders of the theory of electric light fishing," by A. N. Shabanov, pp. 43-45; "Application of dimension analysis for determining absolute trawl efficiency," by V. A. Ionas, pp. 46-48; "Activity of SRTR-9069 in the North Sea whiting (*Gadus merlangus*) and shark fishery," by V. Teplakov and N. Ivanov, pp. 49-51; "Heat-insulating containers for fish storage on fishing vessels," by N. I. Sukrutov and P. P. Iaskevich, pp. 59-62; "Revision of the technical plan of combined fish smoking," by V. P. Skachkov, pp. 67-69; "Cost accounting and net cost on vessels of the fishing industry," by Iu. L. Korotkov, pp. 78-80; "Organ-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

ization of cost accounting in fishery enterprises," by V. A. Teplitskii, pp. 80-83; "Bases for increased profits of fishery kolkhozes in the Azov and Black Sea areas," by G. Cherniavskii, pp. 83-87.

No. 3, March 1966: "Flounder resources off western Kamchatka must be preserved," by V. I. Tikhonov, pp. 6-8; "Causes for decrease of chum salmon resources," by V. Kostarev, pp. 9-10; "Cultivation of herbivorous fish in rice fields," by I. N. Biziaev and T. V. Chesnokova, pp. 19-20; "Herring purse fishing in the Norwegian Sea," by A. A. Degtiaev, pp. 26-29; "Net-hauling machines," by V. N. Churinov, pp. 35-36; "Flashing signal lights for different types of fishing," by Iu. I. Bykhovskii, pp. 39-41; "Method for increasing vertical opening of the trawl," by V. Savost'ianov, p. 41; "Intensive fishing of Atlantic salmon in the River Volonga," by L. A. Danilenko, pp. 50-51; "Automated mussel catching and cleaning lines," by A. I. Ivanov, pp. 52-53; "Production and use of ice aboard a tuna factory-ship," by A. G. Ionov, pp. 54-57; "Automated herring-processing line," by V. S. Kuleshov and P. A. Borisov, pp. 63-64; "Automated production of cured fish," by E. Studentsova, pp. 64-67; "The use of frozen squids," by L. L. Lagunov and N. E. Nikolaeva, pp. 71-73; "New method of preparing meal from fish waste," by P. I. Andrusenko, p. 73; "New principles of planning and prices for fishery production," by P. Nesmashnyi, pp. 77-78; "Certain indices of economic efficiency of BMRT trawlers in the northern basin," by B. N. Akimov, pp. 82-83.

No. 10, October 1965: "Commercial fisheries potential of the Atlantic," by A. N. Probatov and B. I. Mikheev, pp. 5-8; "Arctic Cod (*Boreogadus saida*) concentrations in the Arctic Ocean," by D. A. Butorin, pp. 8-9; "Increasing the efficiency of Sakhalin fish hatcheries," by A. E. Landishevskaja, pp. 9-11; "The effect of ultra sound on the growth of immature sturgeon," by V. V. Mil'shtein, A. Kh. Pateev and V. V. Rozhkov, pp. 11-13; "Mussel resources in the northwestern Black Sea," by A. I. Ivanov, pp. 15-19; "Problems of continued development of fisheries on the high-seas and oceans," by N. M. Saburenkov, pp. 26-29; "A new type of vessel is needed for purse-seine fishing," pp. 29-30; "Instrument to determine the movement angle of the cross beam of trawl otter-board," by V. F. Mitsul and A. I. Shevchenko, pp. 42-44; "Fur seal catching methods," by V. A. Arsen'ev, pp. 50-53; "Mechanized hauling of drift nets in the Far East," by S. N. Likhanov, pp. 53-57; "New commercial fishes of the Atlantic," by V. N. Podesevalov, Zh. and L. Pavlova, pp. 57-62; "Pump for pumping fish offal," by V. I. Nazarov, pp. 69-71; "Resources of our commercial fishery fleet," by S. A. Maiorova and A. A. Vagner, pp. 78-80; "Experiments to prolong storage time of fish meal," by T. Dombrovskii, and T. Vitas, pp. 85-87; "World production of fish meal," by A. B. Kuz'michev, pp. 87-91; "Communication from the U.S.S.R. Federal committee on fishery production," pp. 92-93.

UNITED KINGDOM:

Annual Report and Accounts for the Year Ended 31st March 1966, 60 pp., printed, 5s. (70 U.S. cents), White Fish Authority, Lincoln's Inn Chambers, 2-3, Cursitor Street, London, E.C.4, England. (Sold by Her Majesty's Stationery Office, 49 High Holborn, London W.C.1, England.) Summarizes information on fresh and frozen white fish production, distribution and marketing, research and development, economic research and planning, and administration. The report also includes tables on supplies, fishing fleet, White Fish subsidy, conservation, etc.

The Cornish Pilchard and its Fishery, by John Bridger, Laboratory Leaflet (New Series) no. 9, 17 pp., illus., processed, November 1965, Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, Suffolk, England.

"The handling and care of fish at sea," by J. J. Waterman, article, Supplement to Fishing News and Fishing News International, July-September 1965, 88 pp., printed, Arthur J. Heighway Publications, Ltd., Ludgate House, 110 Fleet St., London EC4, England.

"Storage of frozen fish," by I. Robertson and R. M. Love, article, Food Manufacture, vol. 40, December 1965, pp. 43-45, printed, Grampian Press, Ltd., The Tower, Shepherds Bush Road, Hammersmith, London W6, England.

VESSELS:

Utilization of U. S. Otter-Trawl Shrimp Vessels in the Gulf Area, 1959-1961, by Roy L. Lassiter, Jr., 63 pp., illus., printed, \$4.00. Bureau of Economic and Business Research, College of Business Administration, University of Florida, Gainesville, Fla. 32603. The purpose of this study is to determine: (1) the extent of shrimp vessel utilization in the Gulf area in 1959, 1960, and 1961 in terms of fishing effort as measured by days fished and the number of trips, and in terms of success as measured by the pounds of shrimp landed; and (2) the relationship between vessel size, the state from which the vessel operates (state location of controlling port), and vessel utilization. The data are analyzed on both an annual and seasonal basis. The seasonal pattern of shrimping operations was thought to be a possible indication of the extent to which shrimp vessels could be employed in alternative uses. To ascertain possible factors influencing vessel utilization, effort, and production, this study provides a statistical analysis of the relationships between types of vessels, landings, days fished, trips, and areas fished.

WHALING:

"Sailing north for whalebone," by Ralph T. Adams, article, Alaska Sportsman, vol. XXXII, no. 7, July 1966, pp. 10-13, illus., printed, single copy 50 cents. Alaska Northwest Publishing Co., Juneau, Alaska 99801.



TWO "FLAVOR-RIGHTS" FROM THE SEA FOR SPRING

The Captain of a mythical ship from New England in early spring of 1867 gave his mythical crew permission to go ashore in San Francisco. He took his wife Lucy, an avid recipe collector, to the finest restaurant in the city. During this voyage, Lucy wrote a series of letters to her cousin Sarah, who remained in New Bedford. From these letters, the United States Department of the Interior's Bureau of Commercial Fisheries announces a new collection of kitchen-tested recipes for today's busy homemaker.

Looking for adventure in your menu planning? Now that spring is in the air, you'll want to perk up your menus with something new and different.

Elegant is the word for San Francisco Sole Superb, a deep sea treat from the land of the Golden Gate. Delicate sole fillets are simmered in a butter sauce made exciting with onion and white wine. Then, for that special touch, the sole is broiled with the thickened sauce to which cream and seedless California green grapes have been added.



Flavor, convenience, and economy describe Smoky Tuna Potage, another specialty from the West Coast. Try this nourishing soup anytime for quick vitality and that well-fed feeling.



San Francisco--1866.

SAN FRANCISCO SOLE SUPERB

2 lbs. sole fillets or other thin fish fillets, fresh or frozen	$\frac{1}{4}$ cup dry white wine
1 teaspoon salt	$\frac{1}{2}$ cup half and half cream
Dash white pepper	1 egg yolk, beaten
1 can (8 $\frac{1}{2}$ ozs.) seedless green grapes	1 tablespoon flour
2 tablespoons butter or margarine	$\frac{1}{2}$ teaspoon salt
$\frac{1}{2}$ cup chopped onion	Dash nutmeg
$\frac{1}{4}$ cup grape liquid	Paprika

Thaw frozen fillets. Skin fillets. Sprinkle both sides with salt and pepper. Roll fillets and secure with toothpicks. Drain grapes, reserving liquid. Melt butter in a 10-inch fry pan. Add onion and cook until tender. Place fish rolls in pan. Add grape liquid and wine. Cover and simmer for 8 to 10 minutes or until fish flakes easily when tested with a fork. Place fish on an oven glass or metal serving platter; remove toothpicks. Keep fish warm. Combine cream, egg yolk, flour, salt, and nutmeg. Add gradually to hot liquid and cook until thickened, stirring constantly. Add grapes. Pour sauce over fish and sprinkle with paprika. Broil about 5 inches from source of heat for 4 to 5 minutes or until lightly browned. Serves 6.

SMOKY TUNA POTAGE

2 cans (6 $\frac{1}{2}$ or 7 ozs. each) tuna	1 teaspoon liquid smoke
2 cans (10 $\frac{1}{2}$ or 11 $\frac{1}{2}$ ozs. each) condensed green pea soup	$\frac{1}{2}$ teaspoon marjoram
2 cups water	$\frac{1}{2}$ teaspoon salt
1 can (8 ozs.) sliced carrots	Paprika

Blend soup and water in a 2-quart saucepan. Add remaining ingredients except paprika; mix thoroughly. Cover pan and simmer for 15 minutes. Sprinkle with paprika. Serves 6.

Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.



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ASSURED EXPORT QUALITY

Meet the challenge of foreign markets with U.S.D.I.-inspected fishery products. Few countries can offer foreign buyers the assurance of quality that U.S. inspection and grading services provide. Institutional and consumer buyers from abroad can depend on Government assurance that their specific requirements have been met by the suppliers. Official Government certificates are issued, attesting to the results found upon examination of the product. U.S.D.I. inspection services are available at many major ports in the United States.

